Experiment Station Report
Alaska

H. J. Hodgson - Economics

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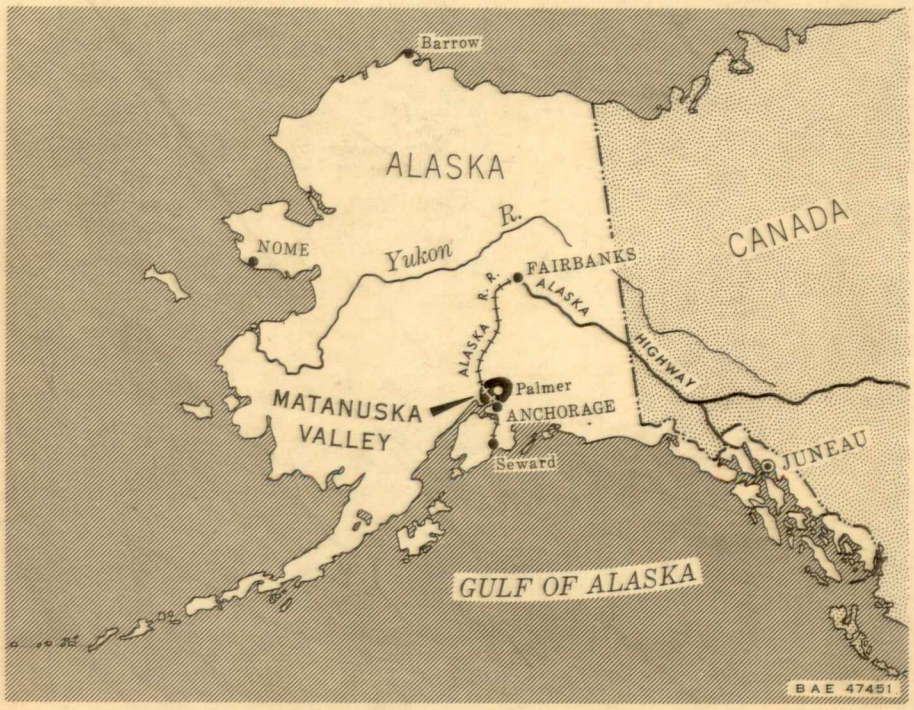
SOME ECONOMIC ASPECTS OF FARMING IN ALASKA

(WITH CHIEF ATTENTION TO THE MATANUSKA VALLEY)

(Progress Report)



UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS
cooperating with
ALASKA AGRICULTURAL EXPERIMENT STATION

WASHINGTON, D. C.
JANUARY 1950

PREFACE

A study of economic aspects of farming in Alaska was undertaken at the request of the Department of the Interior-Department of Agriculture Committee on Group Settlement in Alaska which was appointed at the request of the Secretary of the Interior.

The Committee consisted of H. H. Barrows, Chairman; E. H. Wiecking and O. L. Mimms, Department of Agriculture; R. K. Coote and W. U. Fuhriman, Department of the Interior.

The Bureau of Agricultural Economics in the Department of Agriculture assumed full leadership and responsibility for making the survey and agreed to make the findings available for use of the Committee.

A preliminary report was made available for Committee use in January 1949. The present progress report was prepared for general distribution to supply, in part, the demand for factual economic information regarding farming in Alaska. Studies are being continued which will provide the basis for more comprehensive reports, particularly regarding prospects, requirements, and need for additional agricultural settlement in Alaska.

Although the Bureau of Agricultural Economics was responsible for the study, the Bureau of Land Management of the Department of the Interior made one professional worker available for 3 months and otherwise contributed to the field work.

Many Alaskans gave helpful suggestions. Thanks are due to members and officials of the Alaska Experiment Stations, the Alaska Extension Service, U. S. Soil Conservation Service, the Alaska Rural Rehabilitation Corporation, the U. S. Farmers' Home Administration, U. S. Rural Electrification Administration, the Matanuska Valley Farmers' Cooperating Association, and especially to the Alaska farmers, most of whom were interviewed by members of the field crew. Assistance rendered by the Washington office of the Rural Electrification Administration and the Farmers' Home Administration is gratefully acknowledged. The field work was done by O. L. Mimms, J. L. Paschal, Christian A. Stokstad, and W. U. Fuhriman.

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WITH CHIEF ATTENTION TO THE MATANUSKA VALLEY
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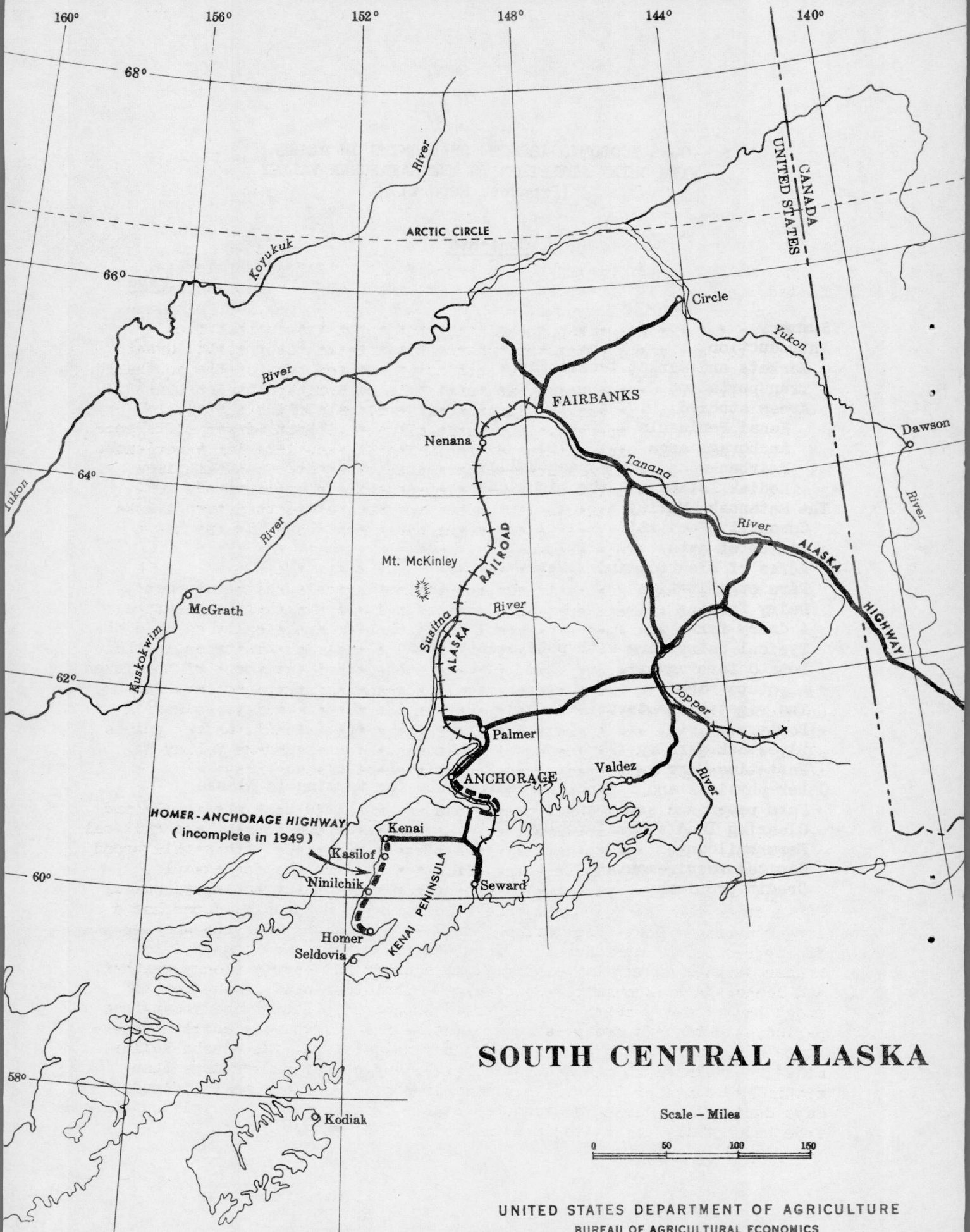
160°
156°
152°
148°
144°
140°
68°
66°
64°
62°
60°
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ARCTIC CIRCLE
CANADA
UNITED STATES
Koyukuk River
Yukon River
Kuskokwim River
Circle
FAIRBANKS
Nenana
Dawson
Tanana River
Yukon River
ALASKA HIGHWAY
Mt. McKinley
ALASKA RAILROAD
Susitna River
McGrath
Copper River
Valdez
Palmer
ANCHORAGE
HOMER-ANCHORAGE HIGHWAY
(incomplete in 1949)
Kenai
Kasilof
Ninilchik
Seward
KENAI PENINSULA
Homer
Seldovia
Kodiak
SOUTH CENTRAL ALASKA
Scale – Miles
0
50
100
150
UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

SUMMARY

Alaska is very large; it is one-fifth the size of continental United States. Distances are great. Ketchikan in the southeast is farther from Attu in the southwest than New York is from San Francisco. The distance from Ketchikan to Point Barrow approximates that from Seattle to San Diego. There are sharp contrasts in topography. Great rugged mountain ranges, capped with glaciers, cover much of the southern parts. The broad Yukon Valley and artic plains dominate the northern landscape. There are marked differences in climate. The southeast "Panhandle" has a comparatively equable climate without marked difference between summer and winter temperatures. The Alaskan interior experiences extreme differences with winter temperatures often 40° F and at times more than 66° below zero, and summer temperatures at times above 90°. Annual precipitation exceeds 100 inches in parts of southeastern Alaska but generally becomes less as one moves north and west. It reaches a low of 4 inches at Point Barrow.

Most areas of present and prospective agricultural development, however, do not embrace such wide contrasts in topography, temperature, and precipitation. Apparently most lands that are physically capable of being developed into cropland, when needed, lie at low altitudes in the river valleys between 144° and 152° west longitude, and south of the Yukon River. Within this broad region, small acreages of cropland have been developed in the vicinity of Fairbanks in the Tanana Valley, Palmer in the Matanuska Valley, Anchorage at the head of Cook Inlet, and at points along the west coast of the Kenai Peninsula. The Matanuska Valley is the only sizable developed agricultural area in Alaska today.

What additional land, where, and how much, is both physically and economically suitable for profitable agricultural development are critical questions. There are climatic and physical differences within this broad region which have agricultural significance. At Homer, for example, average annual precipitation, as shown in the following table, is nearly three times that at Fairbanks, and twice that at Matanuska. Homer has a larger average frost-free period than does Fairbanks. But the shorter frost-free period at Fairbanks compared with Homer is compensated for by higher average summer temperatures, more clear and partly cloudy weather, and longer days in summer. Fairbanks on the other hand is subject to frost hazard every month in the year. Both precipitation and frost-free period at Matanuska are greater than at Fairbanks, whereas summer temperature and possible hours of summer sunshine are less. Matanuska Valley, midway between Fairbanks and Homer, has fewer cloudy summer days than either Fairbanks or Homer. In all areas many cloudy and partly cloudy days during the growing season prevent the long hours of possible sunshine from being fully effective in stimulating plant growth.

Selected climatic data at three localities in Alaska

Station	Precipitation		Ave. frost free period	Mean temperature		Possible summer sunshine per day 1/	Percentage of summer days 2/		
	Peak month	Average annual		Jan.	July		Clear	Partly cloudy	Cloudy
	Inches	Inches	Days	F°	F°	Hours	Pct.	Pct.	Pct.
Fairbanks	Aug. 2.4	11.7	96	-11	60	19.1	19	33	48
Matanuska	Aug. 2.3								
	Sept. 3.3	15.5	108	13	58	17.7	21	38	41
Homer	Sept. 3.2	32.6	112	23	55	17.3	14	31	55

1/ Average hours between sunrise and sunset during June, July, and August.

2/ Average 1939-46 for June, July, and August. Data opposite Fairbanks are averages for stations at Fairbanks, Circle Hot Springs, and University Experiment Station. Data opposite Matanuska are averages for 5 stations in Matanuska Valley.

Permafrost (permanently frozen earth) is associated with low winter temperatures such as occur at Fairbanks. In some localities masses of clear ice are found at various depths throughout the frozen earth. They range from small lenses to blocks the size of a house and larger. These impose hazards to farming. To clear and farm the land removes the insulation of the natural cover and, over the years, permits the earth to thaw to greater and greater depth. Cavities are formed by melting of ice blocks. The earth caves in, forming pits and holes which render this land difficult to farm or even incapable of being cropped. Difficulties in obtaining adequate and potable water for livestock and domestic use and in preventing the freezing of wells and water mains are frequently encountered in permafrost areas.

There are some differences in quality of soils but throughout present agricultural areas, and those investigated so far, the soils generally are not highly fertile and require manure or commercial fertilizer for economic production on a commercial scale. The growing season is short. Soils in the Tanana Valley are "too cold for growth of roots of plants below 12 to 18 inches." 1/ Growth may occur at slightly greater depths at Matanuska and Homer, but root growth generally is restricted to the upper 2 feet of soil. "In all thinking about soil-plant relationships in Alaska, the shallowness of the true soil solum (A and B horizons) regardless of the total depth of fine material, the youth of many of the soils, the mellowness of the surface soil, the low temperatures of the soil a few inches beneath the surface (whether frozen or not), the shallowness of roots, the great importance of soil organic matter, and the need for rapid warming for early nutrient supply must all be kept in mind." 1/

1/ Report on Exploratory Investigations of Agricultural Problems of Alaska. United States Agricultural Research Administration. Washington, D. C. 1947. (Processed).

Climate imposes severe restrictions on the crops which can be produced commercially and on the yields which can be obtained economically. Climatic hazards are great - particularly frost and spring drought. Cloudy weather and frequent light rains make the curing of hay and the maturing of grain particularly difficult at Homer, but these are difficulties in all the areas. Excessive moisture content of grain frequently necessitates special handling in order to avoid deterioration in storage. Long periods of winter feeding are necessary for all livestock. Well-insulated housing is necessary for dairy and poultry production, with the possible exception of Homer area.

The compensating effect of various elements in the climate complex results in an appreciable degree of similarity in crops grown and in yields obtained. Physical and climatic differences within the broad region under discussion are small compared with differences between Alaska and most agricultural areas in the States.

There are no areas in the States in which physical and climatic conditions are entirely comparable with agricultural areas in Alaska. Some high mountain valleys in Colorado, Wyoming, and Montana, and localities in the northern parts of Minnesota, Wisconsin, and Michigan, have some similarities in this respect. From the economic viewpoint, however, conditions are not comparable.

Clearing and preparing land for crops is a laborious, time-consuming, and costly task, everywhere in Alaska. Most potential agricultural land is covered with dense growth of small trees and brush. Sawlogs are few but some of the timber can be used for building log structures. Prices of building materials are high, as are prices of machinery, fertilizers, feed, supplies, and wages, living expenses, and private credit. It is expensive to develop and operate a farm anywhere in Alaska at present. Agricultural production in Alaska is, relative to production in the United States, high-cost production.

Prices of farm products also are high in Alaska. Military personnel, laborers, and other personnel required for the construction of military bases, communication lines, roads, airports, and other facilities, by the United States during World War II and since, and other militarily stimulated activities have increased the demand for foods more rapidly than agricultural production in Alaska has increased. This demand for farm products opens agricultural opportunities which many Alaskan farmers have turned to their economic advantage. Opportunities are still present.

The lag of agricultural production may be attributed in part to the time and expense entailed in clearing land and bringing it into production, but wages and opportunities outside of agriculture have been more attractive to most people than farm development and farm operation under Alaskan conditions. Uncertainty as to the future magnitude and duration of the present market no doubt has its influence. Appreciable increase in agricultural production along some lines was achieved by shifting to more intensive crops, by increased use of fertilizers, and

by importation of dairy and poultry feeds. The gap between the quantity of farm products that can now be profitably produced in Alaska and the present demand for them may not be great. The largest currently unfilled demand probably is for fluid milk.

Probably a larger part of the present demand than is represented by this gap arises from military and militarily-induced activities in other lines. The gap might disappear, therefore, if military and construction activities were appreciably curtailed unless they were replaced by other sources of nonagricultural purchasing power within Alaska.

Alaskan farm products must find their market in Alaska. Alaskan agriculture is very limited in its ability to compete successfully in Stateside and foreign markets. At the same time it is subject to strong agricultural competition from the States and Canada in Alaskan markets. So long as Alaska is heavily dependent on food imports from the States, as is now the case, the costs of shipping and handling provide a protective price barrier for Alaskan producers. But if agricultural production in Alaska should begin to "push" the Alaskan market, that price advantage might not only be lost but, if production were large enough, the price level for the given product in Alaska would tend to move downward toward a basis of Stateside prices minus shipping and handling costs to continental United States. Satisfactory local markets therefore depend on the one hand upon strong, permanent sources of nonagricultural purchasing power within Alaska,and on the other hand, on careful adjustment of agricultural expansion in relation thereto.

Most of this market for the areas here under discussion is found in Anchorage, Fairbanks, Palmer, and Seward. Relatively small quantities of Alaskan produce are sent to the mines and fishing villages. It is doubtful whether Alaskan producers in the areas under discussion here could successfully compete with Stateside and Canadian producers in supplying markets in the Alaskan Panhandle. Evidently, in both place and pace, sound expansion of agriculture in Alaska must be geared both to the locality and to the rate of growth of the market in Alaska. The extent, location, and permanence, of the market for Alaska-grown produce is a major factor in determining the locations, the quantities, and the kinds of agricultural expansion that can be soundly undertaken. These important economic considerations in agricultural development in Alaska are now under investigation.

A number of institutional factors are associated with the pioneer stage of development and the isolation of Alaska which retard agricultural development. Commercial airlines, the Alaska Railroad, and the Alaska Highway have decreased the isolation of Alaska, but transportation, storage and marketing facilities for handling farm products generally are not yet well developed, so the market is local, narrow, and contains a high element of risk for perishable products. Our scientific knowledge and farming experience in cold-climate agriculture is meager. The rural government and institutions are not yet well developed.

The major part of this report deals with certain economic aspects of farming in the Matanuska Valley which is now the most important developed agricultural area in Alaska. The report is based mainly on a survey made during the summer of 1948 in which farm records covering farming operations in 1947 were obtained from most of the farmers operating in the Valley.

Information from this survey was supplemented by data from other sources, including interviews with merchants, territorial and Federal employees, and others, and by observations of the field crew. This is a progress report and has some of the limitations common to reports based mainly on one year's records. Economic investigations are being continued by the Alaska Experiment Station and the Bureau of Agricultural Economics, of the U. S. Department of Agriculture, with the expectation that more comprehensive economic reports will be made later.

There was some agricultural development in the Matanuska Valley before Matanuska Colony, sponsored by the U. S. Government, was established there in 1935, but most development occurred after that time. Land acquired for that colonization was divided into farm tracts (mostly 40 acres); a house, a barn, and a chicken coop were built on each tract; part of each tract was cleared; settlers were selected and transported to Alaska and established on the tracts; a town was laid out; a cooperative association was organized and community facilities were built by the Alaska Rural Rehabilitation Corporation under the sponsorship of the Federal Government. The cost of land, of clearing, of building, of machinery, and of food, clothing, and household supplies furnished by the Corporation, were charged against the settlers. It was soon obvious that the total of these was too large to be carried by the settlers, so a general debt adjustment, similar to that in various localities in the States, was made in late 1937. This reduced the debt of each family to an amount that family was considered able to service and repay over a period of years. The adjustment was made before many of the farms were developed even to a subsistence level of production, and 3 years before the first payment was due on the realty contract. Less than 11 acres per farm were cleared by this time on an average.

The Alaska Rural Rehabilitation Corporation has continued to clear land. By 1947, from 8,500 to 9,000 acres had been cleared in the Valley - about three-fourths of the present cropland in Alaska. Many farm tracts generally too small for economic operation, have been combined through purchase or rental into more suitable operating units. Some full-time dairy, potato, vegetable, and diversified farms, have been established. Nevertheless, part-time farms still are twice as numerous as full-time farms and additional cleared acreage is needed to size up many of the farm units.

In terms of numbers, acres of cleared land, and total income from the farm, dairy farms are the most important type in the Matanuska Valley. There were 35 full-time dairy farms in the Valley in 1947 which met the standards of the Territorial Department of Health for Grade A dairy farms. The average dairy farm had 12 cows producing 7,200 pounds of milk per cow.

Milk was marketed through the cooperative, which sold most of it to retail stores in Anchorage. The producer received slightly more than $8 per hundredweight. At the average yields obtained in 1947 it required 6.8 acres to produce all the feed for a dairy cow, but yields in 1947 were below average. With reported usual yields of 1.7 tons hay, 5.8 tons silage, and 1,700 pounds of grain, it would require 5.5 acres per cow (or 6.5 acres per cow with the usual complement of young stock) to produce all feed required.

There was not this much cleared land per cow on dairy farms in general in 1947. Most of the concentrate feed for the cows was imported. Concentrate feeding was fairly heavy, averaging 2,250 pounds per cow. Dairymen were turning to silage, largely oat and pea and some grass, and showed interest in improving the pastures. These practices give promise of reducing the amount of concentrates required for high production and of lowering the costs of producing milk. A satisfactory perennial legume, capable of winter survival, has not yet been developed.

Production of fluid milk at prices satisfactory to producers is not, of course, indefinitely expansible. Competition from imported dried, frozen, and particularly evaporated milk, is significant. Little butter, cheese, or other manufactured dairy product, is produced in Alaska because of outside competition and because current demand for fluid milk exceeds the local production.

A 13-cow dairy farm somewhat better than average grossed $10,760 in 1947 and had a net farm income of $5,408. It was estimated that, at 1948 prices, a 15-cow dairy farm having sufficient cleared land to produce all required feeds (120 acres) would cost $47,000 to fully develop and to provide with buildings, equipment, and dairy stock.

Potatoes are the most important cash crop in Alaska. They were grown on about three-fourths of the farms surveyed in 1948, being found on both full-time and part-time farms. In contrast to dairy farming, lack of cleared land is not a major limitation to production of potatoes in the Valley. Potato production, relative to dairying, is an intensive enterprise and few acres are needed for a full-time farm. Under the price-cost relationships in 1947 this kind of farming was at least as profitable as dairy farming. Average net income in 1947 was $4,706 on potato farms and $4,427 on dairy farms. But there were only about a third as many farms having potatoes as the major enterprise as there were dairy farms.

The extent to which potato production can be profitably expanded is not yet clear. But it is certain that unless quality is improved, or unless the prices are reduced relative to those for similar quality potatoes from the States, there is little prospect for substantial increases in the sales of local potatoes. Obstacles on the production side are not greatly different or more difficult than for many other commodities. Damage from frost is common in the fall. Fertilizer, necessary for attractive yields, is expensive. Other costs are high. Diseases do much damage at times, reducing both yields and quality. But much can be done to overcome these problems.

The major part of the production of vegetables is on a few specialized vegetable farms, or on farms that grow vegetables and potatoes; but some vegetables are grown on other farms. The total acreage of commercial vegetables in the Valley was not much over 100, in 1947. Production problems include the difficulties of getting and maintaining satisfactory stands of plants and the fact that some must be started in greenhouses. Greenhouse plants ready for setting in the field are expensive - around $900 an acre for celery and $400 an acre for cabbage. Marketing is a major problem. Competition with air-borne produce from the States is keen. The marketing season for local produce is short except for root crops and cabbage.

Poultry farming in Alaska is largely on a part-time basis or it constitutes one of two or more enterprises on diversified farms. Poultry were reported on 62 of the 78 farms surveyed in the Matanuska Valley. Only one of these had a poultry enterprise large enough to be considered a full-time farm unit and only seven had 300 hens or more. Average production per hen in 1947 was 127 eggs on poultry farms and 117 on farms having 50 or more hens. Death losses were lower than in the States. In September 1947 local fresh eggs were retailing in Anchorage for $1.30 a dozen - 15 cents above air-borne imported eggs. The competition from high-quality air-borne eggs might increase in a period of declining Stateside prices.

Most flock replacements are brought in as chicks or pullets from the States. Prices are high - 40 cents for a chick and $1.25 for a 6-week old pullet. Laying mash comes from the States, too, costing $7.50 per hundredweight in 1947. But egg-feed price ratios since 1942 have been more favorable to producers than they are in the United States. Offsetting this to some extent are high prices for and high consumption of electricity and fuel for light and heat during the long cold winters.

Hogs are not a major enterprise on farms in the Valley. A few are kept on about one-fourth of the farms, primarily for the family supply of meat. The only specialized hog farms are outside the Valley near sources of garbage which is the main feed for hogs on these farms.

Beef cattle, sheep, and goat enterprises, are seldom found on Alaskan farms. Lack of feed for long winter feeding and competition from outside the territory are major obstacles to profitable production on the mainland. Another obstacle is the limited acreage of cleared land. The place of beef cattle or sheep in Alaskan agriculture is yet to be determined. Prospects are not bright for much expansion in the immediate future. A few farmers have a few beef cattle or sheep. Farmers with favorable locations for summer pasture and with some winter browsing or grazing, with experience, and with a strong will to do so, may find it feasible to develop full-time livestock enterprises.

Lack of adequate capital and credit has been a difficult problem to most farmers in Alaska. The situation inside the developed Colony area has been more favorable than the conditions found outside of it,

where adequate loans have been more difficult to obtain. Interest rates on loans from private sources are relatively high - about 8 percent. Production and subsistence loans from the Farmers' Home Administration at 5 percent, the same rates as in the States, have helped. Real estate loans at 4 percent, also the same rate as in the States, have heretofore been limited by law to a first mortgage, which could be obtained only when title had passed to private ownership. Recently approved legislation, however, authorizes loans on unpatented homesteads, thus greatly widening the scope of credit assistance which the Farmers' Home Administration is authorized to extend to the farmers.

Developing a farm from wild land in Alaska is a costly undertaking. The long cold winters necessitate substantial farm structures. Clearing trees and brush requires expensive equipment and hard work. Prices of materials, equipment, and labor, are high. In addition to capital for buildings, equipment and farm development, funds are needed to pay operating costs and living expenses until the farm has been brought into production.

Developing a farm from wild land in Alaska is a time-consuming job. Trees and brush must be uprooted and pushed into windrows. These windrows must dry out before they can be burned. Complete burn of windrows is seldom obtained, so unburned material must be gathered into piles and burned. Picking up roots after plowing is a recurring task for several years. It takes time after clearing for the soil to dry out, aerate, and warm up; consequently little if any crop can be expected the first year on freshly cleared land. The season for building and working is short. All in all, full production on a farm is not likely to be obtained in less than 5 years.

Developing a farm from wild land and operating it profitably requires skill. Top soils in Alaska ordinarily are not deep and most humus is in the upper few inches. Unskilled clearing, piling, and burning, may destroy much of the productive capacity of the soil. Fertility at best is low and must be built up through suitable cropping programs and good practices. The short growing season requires timeliness in farming operations and wise selection of varieties of crops. High cost rates necessitate constant attention to cash expenses. Skill in marketing is essential to success, particularly for the vegetable grower.

Farming in Alaska thus is a challenging undertaking. Cropping hazards and economic risks are relatively great compared with farming in the States. To be successful probably requires greater initiative, skill, and perseverance, than in the States. But an appreciable number of farmers in Alaska have successfully met the challenge presented by physical and economic conditions in the Territory, and have prospered.

The 1947 situation in the Matanuska Valley, as shown by this study, may be taken to illustrate what has been accomplished agriculturally on the better soils of Alaska under recent conditions of expanding markets, generally favorable cost-price relationships, available credit, and

generally prosperous current conditions outside of agriculture, by farm operators who were experienced in the ways of farming and living in this part of Alaska. The success they have achieved is indicated by the net incomes received and the financial status attained by 1947. In addition, Alaska - the "last frontier" - holds attractions which for many are not measured in financial terms alone.

Within the limits currently imposed by physical and economic factors, there are opportunities for judicious expansion of certain types of farming in Alaska today. This study undertakes to indicate, on the basis of currently available data, both those opportunities and some of the more important conditions and requirements which farmers in Alaska need to be prepared to meet. Available to assist them are recently augmented programs of research, field investigation, and technical and financial aid.

SOME ECONOMIC ASPECTS OF FARMING IN ALASKA WITH CHIEF ATTENTION TO THE MATANUSKA VALLEY (Progress Report) 2/

INTRODUCTION

Information on farming opportunities and alternative systems of farming in Alaska is scarce. Recognizing the urgent need for additional information when sound programs for settlement in Alaska are being developed, the Department of the Interior-Department of Agriculture Committee on Group Settlement in Alaska requested the Department of Agriculture to make soil conservation and farm management surveys in Alaska. The findings of these investigations will supplement information currently available from the Alaska Experiment Stations and other sources.

This progress report on the farm-management survey presents selected aspects of the 1947 picture of agriculture in Alaska. It is part of the information needed by present farmers and settlers in making the most of their production opportunities, and by new settlers in ascertaining the possibilities in agricultural production in proposed settlement areas. It is planned to revise and supplement this progress report by additional information now being obtained by the Alaska Experiment Stations and the Bureau of Agricultural Economics of the U. S. Department of Agriculture.

Markets and Market Facilities

Markets and market facilities are problems of primary importance to Alaskan farmers for they are wholly dependent on markets in Alaska. Commercial production of any agricultural commodity is possible there only in quantities which the local market will take at an acceptable price. It is necessary to examine the market situation in Alaska as a basis for understanding the existing types of production as well as for determining those types of production most susceptible to sound expansion. A brief statement regarding markets is therefore included in this report. A comprehensive study of the markets is now underway.

Anchorage is the market for nearly all farm products grown in the Matanuska Valley. From a population of 3,495 in 1939, it had boomed to a civilian population of perhaps 20,000, by 1947. A large, but unreported, number of military personnel was stationed near Anchorage, Fairbanks, and other towns. Military operations beginning before World War II and increased business activity, directly and indirectly related thereto, are the primary reasons for the increased current market for Alaska farm products. Even this market is not large, the total civilian population being less than 100,000.

2/ Prepared by O. L. Mimms, J. L. Paschal, and W. U. Fuhriman.

Wage rates are high in Alaska, but so are transportation and housing, food, clothing, and other living expenses. Long cold winters also make expensive the house construction, heating, and lighting. For the same reason, out-of-door employment during the winter is limited. The combination of a high cost of living and a short working season tends to create a situation in which high wages are necessary to attract workers.

Prices in Alaska are relatively high compared with the Pacific Northwest. Products imported from the States are priced to include the cost in Seattle plus transportation and insurance costs, as well as handling charges and a profit. Prices determined in this way are serving at present as a protective price barrier or a "floor" for local products when the imported and local product are considered equally desirable by the consumers and the local supply is less than the total demand. Fluid milk is in competition not only with costly fresh whole milk flown from Seattle but also with lower priced imported forms such as evaporated, condensed, dried, and frozen milk.

During most of the year the price of head lettuce, celery, and other fresh garden produce, is determined largely by the cost of importations. During the peak of the local harvest season, however, the price of these products sometimes drops below the import price. Grading for quality and sorting and packing adequately would improve the competitive position of local produce of good quality. Heavy shipments of potatoes to Alaska are made regularly despite the fact that local potatoes generally are cheaper. Many consumers prefer those imported from the States, which they usually consider of higher quality than local potatoes.

Agricultural production in the Matanuska Valley has been limited not only by physical factors but also by difficulties and high costs of clearing land, high costs of farm production, and favorable opportunities for nonfarm work. Prices of Alaska farm products are high, but production costs - including labor, supplies, seed, and equipment - are also high. The major agricultural products of the Valley are either perishable or bulky. The high cost of transportation and the spoilage of goods in transit from the United States encourage this type of production. To date, these producers have not found it profitable to compete with the producers in the States in the case of semiperishable products which have a high value per pound and can readily be shipped long distances. Nearly all butter, cheese, beef, pork, mutton, and similar products, are imported from the States as well as condensed milk, much fresh whole milk, and many eggs. A substantial part of the feed-grain supply is shipped in.

Physical limitations and high production costs combined with the costs of shipping from Alaska to the States have as yet prevented agricultural production for export and will probably prevent it in the foreseeable future - unless new products with special qualities are introduced.

The total Alaskan market for potatoes and for many vegetables is such that a moderate change in the production of a given product may supply too much or too little of that particular commodity for the available market. A few extra acres of an intensive crop, or unusually high yields, or an unexpected shipment from the States, can easily oversupply the market. On the deficit side the lack of a few acres of a given crop, or poor yields, or an interruption of the supply from the States, can bring a severe shortage.

Variations from year to year in acreage and production of local vegetables and changes from year to year in sales to the Army are factors in the present unsatisfactory marketing conditions. Small volumes of production, as well as uncertainty of the quantities, poor quality, or lack of proper sorting and grading, have retarded mature development of the market for local products.

The Matanuska Valley Farmers' Cooperating Association, which was organized in 1936 to serve the Matanuska Valley Colony, is the most important single channel through which farm products are sold. This association markets milk, eggs, potatoes, vegetables, and meat, for the farmers. In 1948 the Valley Producers' Cooperative Association was organized largely for the purpose of handling potatoes and other vegetables.

These two cooperatives, a commission agent in Anchorage, and a cooperative in Fairbanks, sell relatively large quantities of produce, by contract, to the Army, to mining companies, to the Alaska Railroad, and to other large consumers. Apparently no wholesalers were operating in Alaska in 1947 and 1948. Most restaurants and stores ordered directly from the wholesale houses in Seattle. There were, however, a few stores and restaurants that obtained their supplies during the local produce season directly from growers. Some growers of vegetables sell directly to local outlets. A few of these are skilled in handling produce and hotels, grocers, and restaurants, that deal with them have emphasized their dependability, especially with respect to quality of produce and maintenance of regular supply.

In Palmer, the Matanuska Valley Farmers' Cooperating Association operates a general store known as the Trading Post; it sells drygoods, meats, groceries, vegetables, and dairy products. The Association operates a department which sells grains and feed, hardware, and building materials, and a garage at which automobile supplies are sold, repair work including welding is done, and a complete line of nationally known farm equipment is sold. There is a privately-owned lumber yard in Palmer and two privately-owned garages and several filling stations are operated there.

Limited cold-storage facilities are available in Alaska, but commercial cannery plants for agricultural produce are not available and extensive use of the quick-freeze process for preserving food is not yet practiced. Many farm families, however, have pressure cookers and can sealers to facilitate home canning of fish, game, and garden produce.

The marketing channels and facilities for handling vegetables and potatoes are not yet well developed. Small growers come to town at irregular intervals with assortments of ungraded produce which are often difficult to sell. This unorganized and undependable process of marketing does not permit Alaskan producers to exploit their local market fully. The uncertain duration of the demand arising from military construction and military forces stationed in Alaska works against establishing adequate and permanent facilities to meet well even the present marketing needs.

Transportation

All of some products and a major part of others now used in Alaska must be shipped into the Territory, mostly from the United States. Freight for Anchorage, Palmer, Fairbanks, and other interior points, comes mainly to Seward and Whittier by boat - approximately 1,600 miles from Seattle.

Whittier, an alternate seaboard terminal of the Alaska Railroad, was developed during World War II and is used primarily for military freight. From these two points freight moves over the Alaska Railroad to Anchorage, Palmer, and Fairbanks. Some freight is docked at Valdez and moved out by motortrucks. Transportation from Seattle to Valdez, Whittier, and Seward, is furnished by steamship companies and barge lines. The faster schedules offer 5-day service from Seattle to Seward.

Air transportation is of great importance to the economic life of Alaska. Scheduled flights are maintained from Fairbanks and Anchorage to the Twin Cities, Minnesota; Great Falls, Montana; Seattle, Washington; and to the Orient. Unscheduled planes also carry many passengers and much freight. Flying time from the Twin Cities to Anchorage is about 14 hours. The one-way fare on scheduled lines in 1948 was approximately $242. Flying the 1,521 miles from Seattle to Anchorage takes 7½ hours and costs $138 for a one-way fare.

Local air transportation is a boon to Alaskans, who are air-minded. Palmer, an agricultural community, has almost completed a landing strip that will satisfactorily handle planes of the DC-3 type. This strip is being built with the intention that farm produce can be transferred directly from the growers' trucks into planes and be delivered to remote communities within a few hours. Nearly every community can be served by some type of aircraft. Isolated fishing villages, without a landing strip, are reached by float planes or by land planes that use the beaches at low tide for landing strips.

Air transportation is important to the over-all economy of Alaska, but air freight rates are high. For this reason shipments usually consist of highly perishable commodities, of those with high value per pound, or those that are urgently needed. General rates for air freight to Anchorage from Seattle in 1948 were approximately 17 cents per pound and from the Twin Cities 30 cents.

Transportation, both passenger and freight, between the States and Alaska, is relatively expensive partly because it is primarily one-way traffic. Large quantities of consumption and capital goods are shipped to Alaska but little freight except canned salmon is shipped out. In the spring people going to Alaska to work in the canneries, mines and construction activities, fill the planes to capacity, but many of the return flights carry but few passengers. The reverse of this situation is found with the exodus of workers in the fall months. These conditions make for a high transportation cost which in turn contributes to a relatively high price level. Sample freight rates are given in table 1.

Table 1.- Freight charges per hundredweight in effect August 14, 1948 (Steamship and rail charges plus handling costs in car lots from Seattle) 1/

Commodity	From Seattle to		
	Anchorage	Palmer	Fairbanks
	Dollars	Dollars	Dollars
Lumber	1.44	1.52	1.83
Roll roofing	2.59	2.86	4.01
Insulating material	2.14	2.34	3.10
Wall board	1.65	1.77	2.24
Cement or plaster	1.52	1.65	2.03
Iron and steel	2.26	2.51	3.47
Agricultural implements (any quantity)	1.30	1.43	1.43
Vehicles (any quantity)	6.41	6.75	7.51
Grain and grain products	1.73	1.83	2.21
Potatoes and onions	1.76	2.11	2.48
Groceries	2.25	2.86	3.47
Perishables - lettuce, cauliflower, etc., (any quantity)	6.59	7.12	9.43
Citrus fruits and apples	2.42	3.02	4.17
Meat, fresh	6.07	6.61	8.92
Fuel oil and gasoline	.31	.41	1.41

1/ Data furnished by freight agent of the Alaska Railroad, Palmer, Alaska.

Rail freight rates to Fairbanks are considerably higher than to Anchorage and to these rates must be added the cost of moving freight from Fairbanks to outlying areas not reached by the railroad.

Three trains a week are operated from Seward to Fairbanks. There is daily train service from Anchorage to Palmer. A gasoline rail car also operates daily between Anchorage and Palmer which is not on the main line to Fairbanks.

Palmer, 50 miles north of Anchorage, is the trading center of the most highly developed farming area in Alaska today--the Matanuska Valley. It is connected with Anchorage by 48 miles of graded gravel road. It is expected that it will be hard-surfaced in the near future.

A road to connect Anchorage with the Seward, Moose Pass, Kenai, and Homer is now under construction. When completed, it will permit heavy travel from Palmer to Seward and points on the Kenai Peninsula. Anchorage is now connected by highway with Fairbanks and Valdez and by the Alaska highway with Great Falls, Montana, and Seattle, Washington. Some freighting trucks are operating on these roads. Bus service from Palmer to Anchorage, Valdez, and Fairbanks, is available during the summer. The developed parts of the Matanuska Valley are, in general, served by good graveled roads. Outlying areas are not so well served and the need for improved roads is keenly felt.

Public and private lands.- Most cultivated land and land in cities and towns is in private ownership, but this represents only a small part of the total land area. Substantial withdrawals of land for various purposes have been made, but large areas of public domain in many localities are available for agricultural homestead settlement. Lands in Alaska have been open to homesteaders for many years. In frequent instances homesteaders, after acquiring title, abandoned their property and left the Territory without leaving a forwarding address which makes it difficult for prospective purchasers of land to get in contact with such owners.

Until the 1949 session of the Territorial Legislature there was no provision for general property taxation in Alaska except in incorporated towns and in some school districts. Elsewhere land could be retained without paying taxes. There was no way of forcing abandoned land into public or other private ownership or into use, so it remained idle and unimproved. This condition was most noticeable in the vicinity of Homer but is found elsewhere as well.

In an effort to bring abandoned land back into use the Alaska Legislature approved an Act 3/ which requires owners of legal title to lands in Alaska to file a declaration of ownership with the United States Land Office. Failure to file such declaration places a $5 lien against the property, which if not paid within 4 years, makes the property subject to foreclosure by the Territory. No property has been foreclosed to date.

3/ Alaska Laws, Statutes, etc. Laws of Alaska, 1945, Ch. 49.

Figure 1.- Homesteaders' cabins west of Palmer and east of Fairbanks. The first dwellings erected on homesteads frequently are small and inexpensive.

Areas Studied

Chief attention in this report is given to the Matanuska Valley, which is at present the major farming area in the Territory. But brief mention is first made of four other areas. When this study was made approximately a week of reconnaissance work on the Kenai Peninsula was devoted to interviews with more than half the farmers in the Homer area and with other residents at Homer and Kenai. Another week in the Anchorage area permitted interviews with nearly all the farmers there, a few homesteaders, and a few business men.

Kenai Peninsula

The agricultural lands of the Kenai Peninsula are in the western part between the Kenai Mountains and Cook Inlet. The climate is described as follows in, Information for Prospective Settlers in Alaska. 4/

> "The climate is never severe, being neither extremely cold in winter nor hot in summer. It is tempered by the warm winds from the Pacific Ocean, which is less than a hundred miles to the south in a direct line. The same kinds of crops that are produced in the Matanuska Valley can be produced here, with the exception of grain, due to the prevailing overcast rainy weather and lower temperature."

4/ Gasser, G. W. Information for Prospective Settlers in Alaska Cir. 1. Alaska Dept. Agr. Revised and Reissued June 1, 1948.

The Peninsula is remote from present markets and is handicapped by lack of adequate transportation facilities. Completion of the Moose Pass-Kenai-Homer road, now under construction, will relieve this situation to some extent.

The Homer Area.- This area on the southern tip of the peninsula, on the north shore of Kachemak Bay, has the largest developed agricultural acreage on the peninsula. There are several hundred acres of cleared land but much of it is idle. Transportation adequate to move the present produce to market is not available. In 1948 there was no dock to accommodate ships. Small boats or barges brought in supplies from Seldovia, which is directly across Kachemak Bay. Some supplies are brought in by air and a small quantity of farm products is moved out by air. Homer, with a population of perhaps 400, was the market for most of the local produce.

Relatively little farming was done here in 1947. There were not more than eight full-time farmers in the area and their operations were not large. A few hogs, cattle, sheep, and chickens, were raised. A small herd of beef cattle was the major enterprise on one farm. Two farmers had small dairy herds. The local market is extremely limited for all products and lack of transportation facilities has prevented their movement in volume to other parts of the Territory.

Potatoes were the principal crop. Cabbage, lettuce, rutabagas, and other garden crops, and strawberries, were grown successfully, but the market for them is very limited. A small acreage of grain was harvested for hay. Curing hay is difficult because of fall rains and high humidity. A limited number of estimates obtained from farmers in the area indicate that with comparable tillage and fertilizer practices, yields of hay, potatoes, and other produce, would approximate those in the Matanuska Valley.

Kenai and Kasilof.- Agriculture at Kenai and Kasilof has been limited to a few small garden plots of potatoes and other garden crops. Some of these appeared to be doing well in July 1948. Native grasses in some of the open areas had made luxuriant growth by that time.

Anchorage Area

Anchorage, the hub of air transportation in Alaska and the location of the shops and main offices of the Alaska Railroad, is located at the north end of Cook Inlet. It is about 48 miles from Palmer and has a civilian population of perhaps 20,000. Fort Richardson is located at Anchorage.

Crowded housing conditions have resulted in many people moving outside the city proper. Many people employed in the city live on tracts ranging from half an acre to 160-acre homesteads. Relatively little farming is done and only small quantities of farm products are produced for sale. Not more than six full-time farmers were in this area in 1947 and 1948.

Climatic conditions are about the same as in the Matanuska Valley. In general, the soils are not so well suited to farming.

All of the land for 10 miles out on Potter Road has been homesteaded. Approximately 200 acres had been cleared, but very little farming was done in 1947 and 1948. Housing was generally poor and there were few other buildings. Under conditions similar to those existing at the present time, commercial farming is not likely to increase materially.

Hogs, chickens, and potatoes, were the major farm enterprises. One farm had approximately 8 acres of vegetables, mostly cabbage. Hay was reported on three of the farms. There were three poultry farms and several home flocks of chickens. Three farmers had hogs; each had slaughter facilities and sold meat and lard to local merchants. A major part of the feed was garbage from Fort Richardson. Some grain was fed, mostly to sows just before and after farrowing.

Fairbanks and the Tanana Valley

Tanana Valley region, of which Fairbanks is the principal city, is located in the center of Interior Alaska. It is approximately 200 miles in length and from 20 to 60 miles in width. The Tanana Valley and Yukon Valley regions of Interior Alaska are located within the 60° F. July isotherm. They are the warmest parts of Alaska in summer and the coldest in winter, with a mean temperature in January of -16° F.

Markets and market facilities.- Fairbanks is located in the interior at the northern terminal of the Alaska Railroad, and freight costs contribute considerably to high prices. Before the expanded military operations, which began in the early 1940's, the market for agricultural products was extremely limited. In 1939 Fairbanks had a population of 3,455. In 1948, it had a civilian population of probably 8,000, and, in addition, several thousand military personnel were stationed at Ladd Field.

The Tanana Valley Farmers'Association, Inc., is the only agency serving as a wholesaler of agricultural products. In 1948 this association was dealing primarily with the Army and did not concern itself particularly with the civilian market. Stores and restaurants ordinarily buy potatoes, other vegetables, and eggs, direct from wholesalers in Seattle, but a few local farmers have established satisfactory markets by dealing directly with individual restaurant and store managers. Generally, however, marketing by individual farmers was unsatisfactory both to them and to the buyers, according to testimony. Buyers from such sources expressed dissatisfaction because of unreliable supply and variation in quality and many restaurants and store operators were not satisfied with the cooking quality of local potatoes. Farmers experienced difficulty in selling small lots of ungraded produce and were often dissatisfied with the prices offered.

Farmers bought commercial fertilizer through the cooperative association or from local dealers. Livestock feeds were bought through a wholesale grocery and from local stores.

Farm machinery, automobiles, motortrucks, and power equipment, were available through several dealers.

Agencies for marketing farm products of the Tanana Valley are relatively new and facilities and methods for grading, storing, and moving products to market are inadequate or have not been organized to function most effectively. Marketing probably will continue to be a major problem for several years.

The developed agricultural area of the Valley lies mostly in the vicinity of Fairbanks. The farms are mostly along the farmers' Loop road and along the Steel Creek road, lying north and northeast, respectively, from Fairbanks. Some cleared land and several homesteads are also to the west and southwest of the town. Others, mostly undeveloped homesteads but some with cleared land and a few buildings, are farther out along the Alaska Highway.

Exclusive of the undeveloped homesteads, it is estimated that not more than 30 farms, both full-time and part-time, were operating in the Valley in either 1947 or 1948. Twenty-five farm operators and several merchants and other residents were interviewed.

Climate.- Information for Prospective Settlers in Alaska, 5/ describes the climate in this area as follows:

> "For the years 1932-47 inclusive, the highest temperature recorded at Fairbanks was 99° F., and the lowest was -65° F. During the growing months, beginning with May, the normal temperature shows a steady rise, reaching its peak in July. The growing season for hardy plants, such as grains and grasses, averages 123 days on south slopes. For tender plants, such as potatoes, the growing season averages 105 days. On the Valley floor, the growing period is several days less . . .

5/ See footnote 4, page 16.

"The winters are cold and during the two months of lowest temperature, the normal average for 1932-47, inclusive, ranged from -4° F. to -18° F. in December and from -1° to -22.5° in January. The winter weather is healthful and invigorating and the air is dry, crisp, and clear. The average annual snowfall for the past eight years was 59.39 inches. Winter winds are not common and the snow does not drift appreciably. It is usually light and feathery and remains in this condition for most of the winter.

"Total precipitation ranges from 8.5 to 16 inches with approximately half of it coming during the growing season. However, because of the lower temperatures and a favorable evaporation-precipitation ratio, cereal crops can be produced with as little as 8 inches of total precipitation advantageously distributed, peak occurring during August.

"Dry weather in late spring and early summer sometimes checks plant growth to such an extent as to cause low yields, or subsequent moisture may prolong the growth and thus lessen the chance of maturity and increase the danger from frosts either before or after cutting. Drizzling rains and cloudy weather are common in late summer and may cause difficulty in curing hay."

During the growing season the days are long. Possible hours of sunlight on June 19 are about 22½, and almost 20 on July 19. Twilight is continuous throughout the short nights of June and July and parts of May and August. Long hours of daylight and sunshine contribute to rapid growth of plants, but offsetting these to some extent is the number of cloudy days.

Permafrost.- Earth in the Tanana Valley is frozen to varying depths ranging to more than 100 feet in some localities. Where the natural vegetation cover has not been disturbed the thawing in summer ordinarily affects only the top foot or two of earth. Consequently, masses of earth remain continuously frozen. This condition is known as permafrost. It occurs throughout a large part of the Valley area.

Part of the permafrost consists of lenses or blocks of clear ice of various sizes. When the natural cover is disturbed by clearing and cultivating the land, thawing goes to greater depths in summer. The depth of summer thawing may increase over a period of time to a point at which it exceeds the depth of winter freezing, and permafrost may eventually disappear.

When ice blocks associated with disappearing permafrost melt, they leave cavities which cause the surface area to sink. A number of farm fields in the vicinity of Fairbanks have become hummocky and too rough for

cultivation. A few fields have been releveled only to become uneven again. Hay is harvested with difficulty from some hummocky fields; some are pastured while others have been abandoned, at least temporarily.

Soils.- Generally soils in this Valley are developed from relatively young stream alluvium or from mantles of silty, very fine sand, thrown up by the wind over the gently sloping upland on the margins of the Valley. These soils are low in organic matter and deficient in nitrogen and phosphorus content. Application of manure or commercial fertilizers is necessary if satisfactory yields are to be obtained. The sloping cropland is subject to severe erosion from rainfall or rapidly melting snow, especially in the early spring.

Types and sizes of farms.- Information adequate to permit classifying them by type and size was collected on 19 farms in the Fairbanks area, table 2.

Table 2.- Average acreage of land and crops per farm reporting, 19 farms, by type of farm, Tanana Valley, Alaska, 1947

Land use	Vegetable-potato farms		Vegetable farms		Poultry farms		Hog farms	
	Number of farms	Acres per farm	Number of farms	Acres per farm	Number of farms	Acres per farm	Number of farms	Acres per farm
	Number	Acres	Number	Acres	Number	Acres	Number	Acres
Cropland and seeded pasture	12	30.4	4	19.2	2	16.2	1	48.0
Other land	12	146.5	4	142.0	2	383.8	1	77.0
Total land	12	176.9	4	161.2	2	400.0	1	125.0
Grain	2	16.0	2	1.5	2	15.2	1	48.0
Hay	1	19.0	--	--	--	--	--	--
Green manure	3	7.3	--	--	--	--	--	--
Potatoes	12	11.2	--	--	--	--	--	--
Vegetables	12	4.9	4	3.1	--	--	--	--
Seeded pasture	1	18.0	--	--	--	--	--	--
Idle or fallow	10	7.0	3	20.5	1	2.0	--	--

Not all of the cleared land on the 19 farms was in crops. Nine acres were fallow and approximately 125 were idle. Some of this was only recently cleared, but much of it was old land in condition for crops. Some of the newer settlers were clearing their own land rather than rent idle land from other owners.

In addition to the 19 farms just mentioned two large dairy farms, several part-time farms on which a few vegetables and potatoes were grown and one large hog farm which used garbage for feed, operated in the Valley in 1947. One commercial garden or farm, composed of a few acres and four large green houses, supplied a substantial part of the celery, tomatoes,

lettuce, cucumbers, and other vegetables, for the local civilian market. The two dairy farms and the dairy herd of the Agricultural Experiment Station supplied the town of Fairbanks with all of its locally produced milk.

Crops.- Grain can be grown and matured in the area. Early varieties and timely planting assures maturity in most years. Because of the rainy season during the harvesting time and high moisture content of the grain, however, the mature grain is likely to heat and spoil unless properly handled after it is threshed. The grain is now grown for livestock feed; at one time a small flour mill was located in the Valley. Barley and oats are the principal grain crops; barley is the better adapted of the two.

Oats and peas are the main hay crop. They are grown also for silage on the dairy farms. There is a small quantity of brome grass-clover hay. Hay or forage crops grow well when fertilizers are applied to the soil. A major part of the oats and peas on the two commercial dairy farms are cut for silage. In the fall of 1948, one of the dairymen was buying fresh cut silage from another farmer. Little hay is used on these dairy farms; much of what is used is shipped from the States. The cost of alfalfa delivered in Fairbanks was $105 a ton in 1948. All of the grains and concentrates for the two commercial dairy herds were shipped in from the States that year.

Several explanations were given as to why only a small quantity of hay was grown by the dairymen. Rains at harvest time often make curing difficult and result in hay of poor quality. No good perennial legume which will survive the winter in the Tanana Valley has been developed as yet. Peas and oats provide more and better quality feed when used as silage than when used as hay. With silage, little hay is needed in the dairy ration. Grains and concentrates were shipped in from the States. These dairymen said they consider it to their advantage to use the cleared lands for forage and pasture and import concentrates rather than reduce their herds and import less feed. Current demand for milk was greater than the quantity produced locally.

Potatoes are the chief cash crop. Several farmers emphasized that the better potatoes in the area are grown on southern slopes where there is less danger of frost damage and where the soils are better drained and warmer. The vegetable crops are mostly cabbage, lettuce, celery, carrots, radishes, cauliflower, beets, and broccoli. Turnips and rutabagas are grown by a few farmers and they do very well, but the market will take only a small volume of them. A few peas, currants, and strawberries are grown. Some cull potatoes are fed to hogs.

Crop yields.- In 1947 the yields were poor, partly because of drought. The season of 1947 was the driest in 40 years, with only 8.5 inches of precipitation. Moreover, ring-rot was severe in much of the potato crop. The average yield of potatoes reported by nine farmers was 2.2 tons per acre in 1947 compared with their estimate of more than 5 tons as a normal yield. Yields of root crops--including turnips, rutabagas, carrots, and radishes-- were below average, in 1947; complete

failures were reported in a few cases. Yields ranged from 1½ tons per acre to 10½ tons whereas the usual yields for root crops were reported to be about 10 tons per acre.

Grain yields in 1947 were about 14 bushels to the acre for wheat and barley and 21 bushels for oats. Usual yields for wheat were reported to be 20 bushels per acre, compared with 25 to 30 for barley and oats. Data are available from relatively few farms. They should be collected annually to build up a body of reliable data regarding yields for the area.

Nearly all farmers used fertilizer in 1948. A few reported applications of nitrate of soda and treble superphosphate. The usual mixtures, however, were 5-10-5 and 5-10-10. Several farmers applied 3 to 6 hundred pounds to the acre on grain. The usual applications of mixed fertilizer on potato and vegetable acreage was 4 to 10 hundredweight to the acre. Larger amounts were reported on celery and small garden plots.

Livestock.- Except for the three dairy herds previously mentioned the principal livestock in the area are hogs and chickens. A few goats, sheep, and geese, are raised. There were few horses on farms in 1947 and 1948. One farm had four horses that were used for light tillage; a tractor was used for such heavy work as plowing and digging potatoes.

The two hog farms used garbage from the nearby military base; this was supplemented by very little grain. A few hogs were found on at least two other farms.

Several farmers in the Valley plan to go into the dairy business as soon as they can clear enough land, put down a well that will furnish water, and construct buildings that will meet Territorial sanitary regulations. On some farms an adequate water supply is difficult and costly, if not impossible, to obtain.

Chickens were reported on 8 of the 19 farms visited in the Fairbanks area. Only 3 farmers reported as many as 100 hens. The range in numbers in 1947 was from 24 hens to approximately 700. There were a few chickens on several other farms, but the numbers were not learned. Some locally-grown grain was fed, but most feed was imported from the States. Production of grain on small acreages probably would result in a cost higher than the purchase price of imported feed. The largest farmers plan to grow grain as soon as they have enough acreage cleared.

Kodiak Island and the Aleutians 6/

This section of Alaska does not have any well-developed agricultural areas. On Kodiak Island are several herds of beef cattle and a dairy herd. A cattle-breeding station of the U. S. Department of Agriculture was

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6/ Information in this section is based on interviews with people who have been in the areas and on published material.

maintained on the Island from 1898 to 1931. All grain feed for the dairy stock on the Island is shipped in. Some winter feeding of beef cattle is necessary. Temperatures are not severe but snowfall is fairly heavy, averaging about 48 inches annually and at times it covers the native feed. The Territorial Commissioner of Agriculture in his report previously cited (p. 16), says the lower slopes of the mountains have a heavy growth of grasses and moss-like plants that offer good summer range for cattle. Beach rye and sedges at the heads of some of the bays can be harvested for hay and silage. Curing hay would be difficult, however, in this area of 62-inch precipitation.

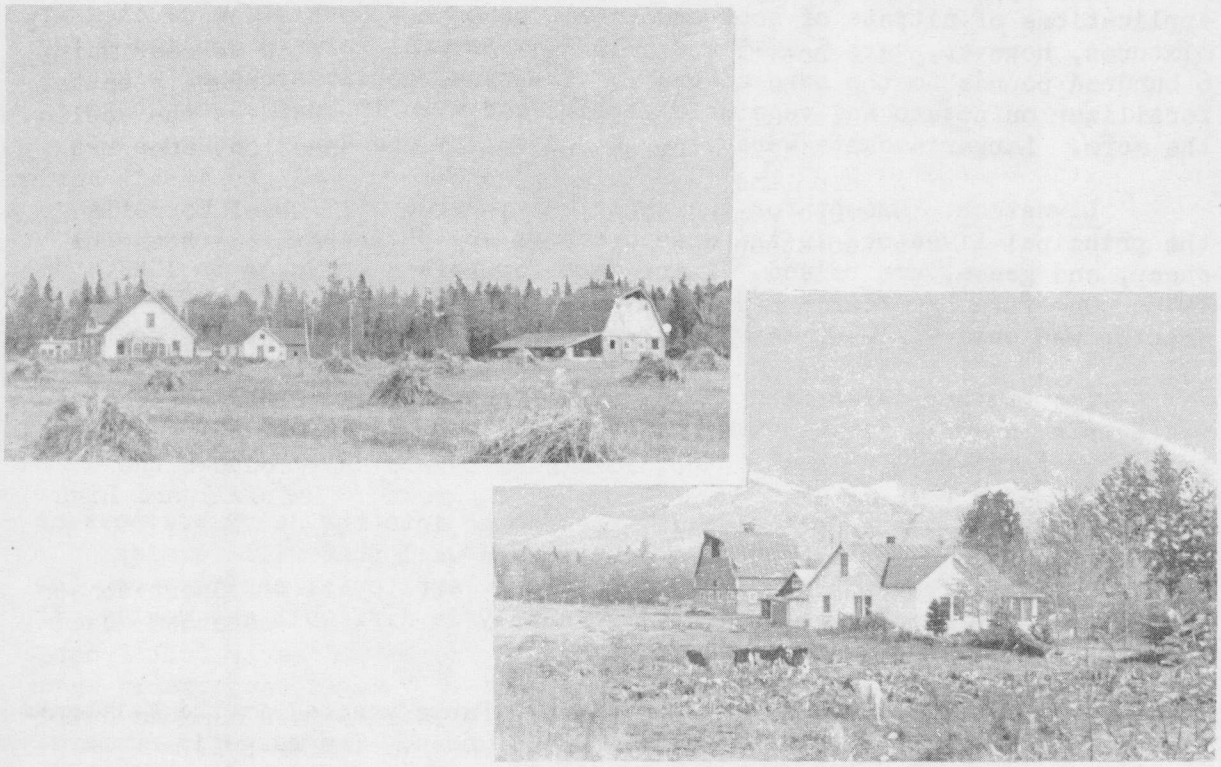

Figure 2.- Typical new or early homesteads in Matanuska Valley.

Year-round grazing is possible on some of the islands beyond Kodiak. Cattle have been on Chirikof Island for several years and have increased in number. They rustle for themselves throughout the year. Recent pictures of these cattle, taken in midsummer, show them in good flesh. Farther south and west, sheep have been raised for several years on Umnak, Unalaska, and other islands.

Livestock raising is possible in southwest Alaska although numerous attempts have failed. The main reasons for failure are predatory animals, distances to market and lack of slaughter houses, cold-storage facilities, and transportation for moving the products to distant consuming centers.

THE MATANUSKA VALLEY

Matanuska Valley, in the vicinity of the town of Palmer, is the site of the Matanuska Valley Colony established in 1935 by the Federal Government operating through the Alaska Rural Rehabilitation Corporation. Some farming was done in the area before 1935, but the major development has taken place since then.

The Valley was originally covered by a dense stand of small timber. The soils were developed from a very fine sand and silt blown up from the bed of the Matanuska River and deposited over gravelly, sandy, and cobbly outwash. During the deposition of the fine material, which is continuing, vegetation was on the land and fairly large quantities of organic matter were buried as the material was deposited. The soils require the application of commercial fertilizer for successful crop production; some are subject to water erosion and to wind erosion when exposed to direct action of the occasional severe winds. The land is generally level to rolling, but areas that are too steep for cultivation are intermingled with the more level areas.

Annual precipitation ranges from 13 to 18 inches, averaging less than 16 inches. The spring seasons are sometimes too dry for most desirable seeding conditions, especially for vegetables. Precipitation increases in July, August, and September, and is generally adequate. Particularly during these months cloudiness appreciably reduces the effectiveness of sunshine in producing plant growth. Rainfall and high humidity hinder the curing of hay and storing of grain.

The growing season averages approximately 108 days. Short-season crops--as oat-pea-vetch for silage or hay, small grains, potatoes, head lettuce and celery--are grown. Late spring frosts and early fall frosts sometimes damage some crops. Crops may also be damaged, especially when small, by winds that whip them off. Severe wind sometimes damages buildings as well. The climate is further described as follows: 7/

> "The latitude of the Matanuska Valley gives it long winters, short summers and a great variation in the length of the day between winter and summer. Beginning April 15, there are 14 possible hours of sunshine per day. The days gradually increase in length, with May 15 having 17 possible hours of sunshine and June 15 about 20 possible hours. At the time of the summer solstice the sun is below the horizon for only a few hours, and during this time there is no real darkness. After June 22 the days begin to shorten, the decrease being at the same rate as was the increase before that date.

7/ See footnote 4, p. 16.

"The climatic conditions in this valley are transitional between those along the Coast and those in the Interior. Grain can be ripened as in the Interior, but the Matanuska Valley has the advantage of milder winters and a longer growing season."

Average monthly temperatures over a 19-year period range from 12.9° F. in January to 58.2° F. in July. The maximum recorded temperature is 84° and the minimum is -36°.

Domestic and stock water comes mainly from wells. Some comes from streams and lakes, at least seasonally. Wells range in depth from 12 to 300 feet; most of them furnish adequate water but some have gone dry. Many dry holes have been dug in the valley--several on the farm.

Community Facilities

The Valley area is served by a large consolidated school. Children are transported to and from the school daily by buses over a network of graded gravel roads. Several churches and community organizations of various kinds are active. Palmer has its own hospital, doctor, and dentist. The Chamber of Commerce points out that there are approximately 70 privately-owned businesses and two modern hotels in the town.

The town of Palmer and a large number of farmsteads are served by electric lines. Coal is readily available in nearby mines and wood fuel can be cut on nearly all farms in the Valley. Oil is used extensively for heating; many people considered it more economical than wood under 1948 conditions, and found it more convenient than wood or coal.

The Valley is served by district agricultural extension agents and a home demonstration agent as a part of the activity of the University of Alaska and the United States Extension Service. The Soil Conservation Service also maintains offices at Palmer. The main station of the Alaska Agricultural Experiment Station is located here. The Rural Electrification Administration which serves the Matanuska Valley also has offices in Palmer.

The Alaska Rural Rehabilitation Corporation has been one of the key agencies in the development of the Matanuska Valley community since 1935. Today it is primarily a farm loan and collection agency, but it is also carrying out its commitments for clearing land. Historically the Corporation, established April 12, 1935, has handled numerous activities including: the setting up of a temporary camp for the colonists at Palmer; making available to selected settlers a farm home, not less than 40 acres of land, and funds for improvement which were to be repaid on an amortized plan of 30 years; clearing of land at specified prices; supplying farm machinery and equipment; supplying subsistence at actual cost until the colonist was self-supporting; and, building and equipping the necessary

cultural, recreational, health, work, and business centers in the community. The Corporation acts on applications to purchase public lands in the Colony reserve and permits consolidation of the original 40-acre tracts of land through purchase.

The Corporation organized the Matanuska Valley Farmers' Cooperating Association, which was incorporated October 28, 1936, and established the community center. It managed this coop until January 1940 when it and the community center were turned over to the colonists. In the transfer the Corporation was given a 30-year non-interest-bearing second mortgage note for $200,000, the first mortgage being held by the Farmers' Home Administration.

The Cooperative is a producer and consumer purchasing and marketing organization. It operates the Trading Post with its many departments, the Lodge or dormitory, 13 dwellings, and other property.

Source of Data

Information on agriculture in the Matanuska Valley in this report was obtained from several sources, but most of it came directly from farmers in the area. Some was obtained from the Alaska Experiment Station, the Alaska Rural Rehabilitation Corporation, Farmers' Home Administration records of the Agricultural Conservation Program, and the Matanuska Valley Farmers' Cooperating Association.

Detailed information was obtained from 78 farmers. It was obtained only from those who sold $500 or more of farm products in 1947: a complete list of farmers who sold $500 or more through the M.V.F.C.A. was obtained from the coop's records and to this list was added the names of other individuals who were known to have sold $500 or more of farm products. The total number was approximately 100. Only 74 out of 152 farmers selling to the coop sold as much as $500 worth of farm products through it, in 1947.

Information on acres owned was obtained for 187 farms or rural homes (including the 78 previously mentioned). Information on the cleared acres and whether the operator worked full time on the farm was obtained for some of them. This information is summarized in the next few paragraphs. It is followed by a fuller discussion of the organization and operation of the 78 farms.

Acres of Cleared Land

Clearing land in the Matanuska Valley has been slow and expensive even though most of it has been done with modern equipment by the Alaska Rural Rehabilitation Corporation under long-term repayment contracts. Matanuska Valley is the only locality where this Corporation has operated and it is the only locality in Alaska with a sizable acreage of cleared land. Even so, less than a fifth of the tillable land in the Valley is cleared. The exact acreage of cleared land is not known at this time, but some estimates are as high as 8,500 to 9,000 acres.

In a Soil Conservation Survey, W. A. Rockie estimated that 48,357 acres in the Valley can be tilled regularly. This includes 29,232 acres of Class II and 19,125 acres of Class III land. Class II land has the most favorable soils and slopes for cultivation in the Valley. Class III is suitable for regular tillage, but has some limitations because of slope or excessive permeability. 8/

The number of acres of cleared land was ascertained for 156 of the 187 units. Fifty-nine of these were operated by full-time farmers and the other 97 by part-time farmers. That the acreages of cleared land are so limited may partly explain the relatively large number of part-time farming operations--many operators do not own enough cleared land to permit them to do full-time farming. Lack of capital with which to clear and bring land into cultivation is another explanation. Opportunity for other jobs at good wages probably is the principal factor. Many of the original Matanuska colonists now have regular off-farm jobs. Some of these run a small farm enterprise on the side; others do no farming.

Nearly half of the 97 part-time farmers owned less than 21 acres of cleared land and 90 percent owned less than 41 acres that were cleared (table 3). Of the 59 full-time farmers, 44 percent owned less than 41 cleared acres and 71 percent owned less than 61 cleared acres.

Table 3.- Acres of cleared land on 156 of the 187 units by type of operator, Matanuska Valley, Alaska, 1947

Acres cleared	Full-time operators		Part-time operators		All operators	
	Number	Cumulative percent	Number	Cumulative percent	Number	Cumulative percent
1 - 10	2	3	27	28	29	19
11 - 20	5	12	21	49	26	35
21 - 40	19	44	39	90	58	72
41 - 60	16	71	8	98	24	88
61 - 80	11	90	0	---	11	95
81 and over	6	100	2	100	8	100
Total	59		97		1/156	

1/ Acres of cleared land not known for 31 operators, 24 of whom were part-time operators.

8/ Rockie, W. A. Physical Land Conditions in the Matanuska Valley, Alaska. U. S. Soil Conserv. Serv. Physical Land Survey 41. 1946.

The effect of scarcity of cleared land in retarding full-time efficient farming is evident when it is realized that, with 1947 yields, 120 acres of cleared land were needed to produce all the feed for a 15-cow dairy herd and that fluid milk production currently offers the most promise for successful expansion of agriculture in the Valley. Yet 72 percent of the part-time and full-time farmers had less than 41 acres cleared, or a third of the acreage needed for a 15-cow dairy farm.

Many owners have additional acres that might be cleared. Of the 28 owners having 101 to 140 acres of land, 14 had less than 41 acres cleared (table 4). Of the 34 owners having 141 to 180 acres, 26 owners, or more than three-fourths, had less than 41 cleared acres.

Table 4.- Acres of cleared land on 150 of the 187 units (by total acres owned), Matanuska Valley, Alaska, 1947 1/

Acres cleared end of 1947	Acres owned					
	1-60	61-100	101-140	141-180	181 and over	All farms
1 - 10	5	7	---	6	2	20
11 - 20	9	7	1	8	1	26
21 - 30	7	8	8	4	3	30
31 - 40	3	8	3	7	3	24
41 - 50	1	8	2	5	5	21
51 - 60	---	4	1	1	2	8
61 - 70	---	1	3	0	2	6
71 - 80	---	---	1	3	1	5
81 and over	---	---	2	1	7	10
Total	25	43	21	35	26	150

1/ See footnote 1, table 3.

Farm Organization

Military activities in Alaska during the 1940's increased the demand for food products and resulted in the shift to a more commercial type of farming. Limited markets have developed for potatoes and other vegetables which are now being produced for sale on many farms that do not have enough acres of cleared land for dairy farming. There were 40 Grade A dairies in 1948. Farm records were obtained from 30 that had operated in 1947. They bought most of their feed concentrates. Dairying was possible on some farms only by using land rented from other owners. Detailed information obtained on the 78 surveyed farms is presented in the following pages.

Fifty-three of these 78 farms were run by full-time operators and the other 25 by part-time operators (table 5). Twenty-three of the full-time farmers and only one of the part-time farmers rented some land from others. The small acreage of cleared land per farm, even on full-time farms, is striking. About half the full-time farmers and 96 percent of the part-time had 60 cleared acres or less.

Table 5.- Acres of cleared land, per farm, and types of farms by type of operator, 78 farms, Matanuska Valley, Alaska, 1947

Size or type of farm	Full-time operators		Part-time operators		All operators	
Acres cleared 1/	Number	Cumulative percent	Number	Cumulative percent	Number	Cumulative percent
1 - 10	1	2	2	8	3	4
11 - 20	2	6	6	32	8	14
21 - 40	13	30	12	80	25	46
41 - 60	10	49	4	96	14	64
61 - 80	13	74	0	96	13	81
81 and over	14	100	1	100	15	100
Total	53		25		78	
Type	Number	Percent	Number	Percent	Number	Percent of total
Dairy	30	100	0	0	30	39
Vegetable-potato	10	83	2	17	12	15
Potato	6	50	6	50	12	15
Poultry	5	45	6	55	11	14
Mixed farms	2	15	11	85	13	17

1/ Excludes land cleared during 1947.

It will be noted that all of the dairy farms surveyed are full-time units. The highest proportion of part-time units are potato and poultry farms. Either potatoes or poultry can be integrated fairly well with off-farm work; daily work with poultry can be done before and after regular employment hours and potatoes call for seasonal work that can be done during vacations, off-hours, weekends, or by custom workers.

Size of farm.- The average size of the 78 farms was 154.3 acres (table 6). This includes both owned and rented land. Approximately one-third of the average farm was in cropland and seeded pasture. Acres of cleared land are more important than total acres as a measure of size of farm in this area.

Table 6.- Average acreage per farm and land use on 78 farms, by type of farm, Matanuska Valley, Alaska, 1947

Land use	12 vegetable-potato farms	12 potato farms	30 dairy farms	11 poultry farms	13 mixed farms	All farms surveyed
	Acres	Acres	Acres	Acres	Acres	Acres
Small grain	4.2	15.0	12.2	10.9	4.6	10.0
Hay	11.8	18.6	42.3	11.4	21.8	26.2
Silage	---	---	7.1	---	---	2.8
Potatoes	6.0	11.8	2.9	2.1	3.5	4.7
Vegetables	5.2	1.1	.5	.5	.3	1.3
Seeded pasture	2.6	2.9	11.9	1.0	1.5	5.8
Idle or fallow	9.7	5.6	.7	2.1	4.2	3.6
Total cropland	39.5	55.0	77.7	28.0	35.9	54.4
Other land	129.5	128.8	82.9	64.7	114.9	99.9
Total land in farm	169.0	183.8	160.6	92.7	150.8	154.3
	Percentage of total cropland					
	Percent	Percent	Percent	Percent	Percent	Percent
Small grain	10.6	27.3	15.7	38.9	12.8	18.4
Hay	29.9	33.8	54.5	40.7	60.7	48.2
Silage	---	---	9.3	---	---	5.1
Potatoes	15.2	21.4	3.7	7.5	9.8	8.6
Vegetables	13.2	2.0	.6	1.8	.8	2.4
Seeded pasture	6.5	5.3	15.3	3.6	4.2	10.7
Idle or fallow	24.6	10.2	.9	7.5	11.7	6.6
Total cropland	100.0	100.0	100.0	100.0	100.0	100.0

Dairy farms averaged 78 acres of cleared land per farm. This was more than twice the acreage for any other type of farm except the potato farms which averaged 55 acres.

Measured by acres of cleared land most of the farms are too small for economically efficient dairy farming. Forty-six percent of the farms contained less than 41 acres of cleared land, 64 percent contained less than 61 acres, and 81 percent less than 81 acres (table 5). Only 30 percent of the full-time farmers, but 80 percent of the part-time farmers, operated less than 41 acres of cleared land.

Slightly over a third of the farms had less than 101 total acres of land per farm (table 7). Less than a fifth had 101 to 140 acres.

Land use.- The 78 farms contained a total of 12,043 acres, of which 4,249 acres were cleared and available for farming. Almost half of this cropland was in hay crops, a tenth was in seeded pasture, and 18 percent was in grain (table 6). Nearly 90 percent of the land on these farms was owned by the operators. Of the 1,296 acres of rented land, 776 were cropland and 520 were in woods. 9/

A total of about 100 acres of commercial vegetables--mostly lettuce, cabbage, carrots, and celery--were planted on the 78 farms. Some fields were not harvested for one reason or another: satisfactory stands of plants were not obtained in some cases and in others the vegetables did not reach maturity. Potatoes were planted on 368 acres, or 8.7 percent of the cropland. Approximately 285 acres, or 6.7 percent of the cropland, were idle or fallow.

More than one-half of the cropland on the 78 farms was on dairy farms. All of the silage, nearly all of the seeded pasture, and more than one-half of the hay acreage, were on dairy farms. Slightly less than one-half of the grain was on these farms. Dairy farmers grew approximately the same total acreage of grains as did potato and poultry farms combined.

Cropland on vegetable and potato farms was 477 acres, or more than a tenth of the total cropland in the 78 farms studied. Sixty-two of the 477 acres were in vegetables, 72 in potatoes, and 117 acres were idle. The idle land on these farms accounted for 41 percent of the idle land on all farms studied.

Table 7.- Acres of cleared land by size of farm, 78 farms in the Matanuska Valley, Alaska, 1947

Acres cleared 1/	Acres in farm					
	1-60	61-100	101-140	141-180	181 and over	All farms
1 - 10	---	3	---	---	---	3
11 - 20	3	1	1	3	---	8
21 - 30	3	1	3	2	---	9
31 - 40	3	5	2	3	3	16
41 - 50	---	6	2	2	1	11
51 - 60	---	1	1	1	---	3
61 - 70	---	1	4	---	---	5
71 - 80	---	---	---	4	4	8
81 and over	---	---	2	3	10	15
Total	9	18	15	18	18	78

1/ Cleared land owned and rented by operator in 1947. Excludes land cleared during the year.

9/ "Cropland" as used in this report refers to cleared land in crops, or idle or fallow, or in seeded pasture. Seeded pasture may be brome or some other grass, but often is a mixture of oats and peas or some other combination of annual crops.

On some farms livestock was grazed in the woods. Opinions of farm operators differed as to the desirability of woodland pasture, but in general the impression given was that seeded pasture was much better.

Crops:- The proportion of the total farm in cropland was approximately one-half for dairy farms, one-fourth for vegetable-potato farms, less than one-third each for potato farms and poultry farms, and one-fourth for mixed farms (table 6). Dairy farms contained about 50 percent more cleared land than the average for all farms. Relatively large acreages are needed to provide feed for milk cows. Most of the cropland on the dairy farms was used for producing hay, silage, grain, and pasture. Forage crops get priority on use of the limited acres of cleared land over the less bulky grain feeds which can be imported more economically than hay. Only 4.2 percent of the cleared land was in cash crops and this was confined to about half the farms. In contrast, the proportion of cropland devoted to vegetables and potatoes was 26 percent for the vegetable and potato farms, 23 percent on potato farms, 9 percent on poultry farms, and 11 percent for the miscellaneous groups.

Fifty-eight percent of the farmers grew grain, amounting to an average of 16.6 acres per farm (table 8) as compared with the average of 10.0 acres for the 78 farms. Nearly 90 percent grew hay, mostly oats and peas, averaging 30.1 acres per farm. All of the dairy farmers grew hay, averaging 42.3 acres per farm; this was approximately twice the average acres grown on potato farms or the mixed group of farms and three times the average on vegetable-potato farms and on the poultry farms. More than half of the dairy farmers grew silage, averaging 12.7 acres per farm; silage was not grown by other farmers. Three-fourths of the farmers grew potatoes, averaging 6.2 acres per farm. Potato farmers grew nearly twice as many acres, or 11.8 acres. Half the farmers grew some vegetables other than potatoes, averaging 2.6 acres per farm on these farms. The average acres per farm ranged from 1.1 to 1.6 for all groups except vegetable farms, which averaged 5.2 acres per farm. One-third of the farmers had cropland that was idle or fallow, averaging 10.9 acres per farm reporting. Approximately half of all farmers had seeded pasture which averaged 11.9 acres per farm. More than three-fourths of the dairy farmers had seeded pasture which averaged 15.5 acres per farm.

Crop yields: Crop yields in 1947 were substantially lower than the usual or average yields reported by farmers. The low yields in 1947 were attributed by most farmers to the unfavorable spring, the driest since 1938. Insects and wind did some damage, but apparently no more than usual.

Hay and silage crops in this area are primarily oats and peas. Vetch is planted with the oats and peas on some farms. Ordinarily all available manure is used on hay, silage, and grain crops, and a few farmers applied 100 pounds of 5-10-10 or 43 percent treble superphosphate. Some

Table 8.- Number of farms reporting each kind of crop and average acres, by type of farm, 78 farms, Matanuska Valley, Alaska, 1947

Land use	30 dairy farms	12 vege-table-potato farms	12 potato farms	11 poultry farms	13 mixed farms	All farms reporting
	Number of farms reporting					
Crops:						
All grain	18	4	11	6	6	45
Hay 1/	30	8	11	8	11	68
Silage	17	---	---	---	---	17
Potatoes	18	11	12	7	11	59
Vegetables	10	12	9	5	3	39
Idle and fallow land	5	11	2	5	3	26
Seeded pasture	23	3	6	3	3	38
	Number of acres for farms reporting					
Crops:						
All grain	20.4	12.8	16.3	20.0	10.0	17.3
Hay	42.3	17.7	20.3	15.7	25.7	30.1
Silage	12.7	---	---	---	---	12.7
Potatoes	4.8	6.5	11.8	3.2	4.2	6.2
Vegetables	1.6	5.2	1.5	1.1	1.3	2.6
Idle and fallow land	4.5	10.6	33.5	4.7	18.2	10.9
Seeded pasture	15.5	10.3	5.8	3.7	6.3	11.9

1/ Includes hay crops plowed under for green manure.

others used nitrate fertilizers, 16 or 21 percent concentrate. The use of commercial fertilizer on these crops is not practiced by all farmers though some apply it each year.

Fertilizer is applied to substantially all potato and vegetable acreage. Applications on potatoes averaged approximately 400 pounds per acre. Several different analyses were used but the most common was 5-10-10. Phosphate, mostly 43 percent available P_2O_5, is used to some extent. Commercial fertilizer was applied to vegetables at varying rates but averaged approximately 500 pounds per acre, usually of 5-10-10.

The yield data in table 9 are averages and they include crop-failure acreages. Crops plowed under as green manure were omitted from the yields and crops grazed off were excluded. Crop failure, among the crops shown, in 1947 was relatively largest for vegetables, being 49 percent for cabbage, 40 for carrots, 18 for head lettuce, and 12 percent for celery. Information for cauliflower, rutabagas, turnips, and radishes, was too limited to permit a realistic estimate of yields for 1947.

In estimating usual yields, farmers generally have a tendency to give too little weight to years of low yield and too much to years of high yields, consequently their estimates of usual yields may be higher than the long-time average actually has been. Evidence indicates that 1947 yields, however, were below average for most crops, perhaps for all crops; but the percentage below average differed markedly with the crops. Figures in the "percent of usual" column in table 9 show the percent which reported yields for 1947 were of the estimated usual yields. Considering all factors, it appears that yields of silage, potatoes, celery, and carrots in 1947 were slightly below average and those for other crops appreciably below.

Livestock.- Dairy cattle and chickens were the only classes of livestock of much commercial importance in 1947 (table 10). Four-fifths of the surveyed farmers kept milk cows; 34 of these kept cows only to supply milk for home use; the other 30 sold Grade A milk. These 30 farmers, on January 1, 1947, averaged 12 milk cows and 75 chickens per farm. Some had dairy heifers which freshened during the year and several dairy calves. They had relatively few other livestock.

The 78 farms had an average of 94 chickens per farm. The chicken farms averaged 244 hens, the mixed group 91, potato farms 68, vegetable and potato farms 32. There was an average of 5.7 milk cows, 1.7 dairy heifers, and 1.4 dairy calves per farm (table 10). Some of the dairy calves are fed for veal but many are kept for replacements or for expanding the herds. Eighty percent of the dairy farmers and about 33 percent of the others had dairy heifers (table 10). The practice of buying replacement stock from the States had largely been replaced by local production. Hogs in the Valley are kept mainly for the family meat supply. Only about 27 percent of the interviewed farmers had hogs in 1947; numbers ranged from 1 to 9 head. The average number on 21 farms was 2 head.

Table 9.- Average crop yields, 1947, and usual yields for farms reporting, Matanuska Valley, Alaska

Crop	Acres planted 1947: Number of farms reporting	Acres planted 1947: Average acres	Unit	1947 yields: Number of farms reporting	1947 yields: Average	1947 yields: Percent of usual	Usual yields: Number of farms reporting	Usual yields: Average 2/
Hay	62	29.7	Tons	60	1.2	71	46	1.7
Silage	17	12.7	do.	13	5.2	90	4	5.8
Wheat	28	7.4	Bu.	22	15.4	65	20	23.9
Oats	24	10.5	do.	21	31.7	74	18	42.7
Barley	17	5.1	do.	12	20.6	59	11	35.1
Mixed grain	9	20.7	do.	8	24.0	77	4	31.3
Potatoes	58	6.3	Tons	43	5.2	84	36	6.2
Carrots	8	.6	Lb.	7	9,004	90	4	10,153
Head lettuce	9	1.7	do.	10	6,361	63	5	12,000
Cabbage	11	1.3	do.	11	1/6,270	31	5	20,400
Celery	7	.3	do.	7	17,696	88	1	20,000

1/ Three farms did not harvest any from 7 acres. The average on 8 farms was 14,500 pounds.

2/ Represents farmers' judgment of yields over the last 5 years.

Economic returns from farming.- It has been pointed out in this progress report that data for 1 year do not provide an entirely satisfactory basis for making generalizations. This is particularly true of data on farm income which are affected not only by the vagaries of climate but also by those of the market. Both climate and market are subject to extremes in Alaska. In 1947, crop yields probably were below average but prices generally were relatively high, and there were no maritime strikes or other major disturbing factors in the market. In order to render data on income more intelligible, an attempt has been made to evaluate the data for 1947 in terms of more "normal" situations.

Gross income, as used here, includes cash receipts from all sources, including wages from work off the farm, plus the value of farm products and native fruits consumed by the farm household. It does not include the value

Table 10.- Average number of livestock on all farms and on those reporting each kind of livestock, by type of farm, Matanuska Valley, Alaska, January 1, 1947

Kind	30 dairy farms	12 vegetable-potato farms	12 potato farms	11 poultry farms	13 mixed farms	All farms surveyed
			Average number per farm - all farms			
Milk cows	11.7	1.5	2.0	1.5	2.3	5.7
Dairy heifers	3.1	.42	1.4	.6	1.1	1.7
Dairy calves	2.2	.83	1.5	.8	.6	1.4
Beef steers	.13	.25	.3	—	—	.14
Bulls	.53	—	.08	.09	—	.23
Ewes and sheep	—	3.7	—	—	—	.56
Hogs	.40	.67	.42	.45	1.0	.55
Chickens	74.7	32.0	67.9	244.5	90.9	93.8
Other poultry	2.8	2.2	12.5	4.5	.6	4.1
Horses	.23	.25	.17	.36	—	.21
Rabbits	—	—	—	1.1	—	.15
			Number of farms reporting			
Milk cows	30	7	9	7	11	64
Dairy heifers	24	4	9	3	7	47
Dairy calves	20	4	4	3	4	35
Beef steers	4	3	2	—	—	9
Bulls	16	—	1	1	—	18
Ewes and sheep	—	1	—	—	—	1
Hogs	8	4	3	2	4	21
Chickens	20	9	9	11	9	58
Other poultry	3	2	1	4	2	12
Horses	6	2	2	4	—	14
Rabbits	—	—	—	1	—	1
			Average number for farms reporting			
Milk cows	11.7	2.6	2.7	2.4	2.7	6.9
Dairy heifers	3.9	1.2	1.9	2.3	2.0	2.9
Dairy calves	3.3	2.5	4.5	3.0	2.0	3.2
Beef steers	1.0	1.0	2.0	—	—	1.2
Bulls	1.0	—	1.0	1.0	—	1.0
Ewes and sheep	—	44.0	—	—	—	44.0
Hogs	1.5	2.0	1.7	2.5	3.2	2.0
Chickens	112.1	42.7	90.6	244.5	131.3	126.1
Other poultry	27.7	13.0	150.0	12.5	4.0	26.4
Horses	1.2	1.5	1.0	1.0	—	1.1
Rabbits	—	—	—	12.0	—	12.0

of wild game consumed, which is an appreciable item for some families 10/, nor the rental value of the dwelling. 11/ It does not take into account changes in farm inventory. Gross income on 65 of the 78 farms ranged from $1,425 on a poultry farm to $17,950 on a dairy farm (table 11). Average gross income was $9,100 on dairy farms or nearly twice as much as poultry farms, with $4,697. Potato farms averaged $8,138 and vegetable-potato farms $6,206.

Table 11.- Gross income, by type of farm, 65 farms, Matanuska Valley, Alaska, 1947

Type of farm	Number of farms	Gross income	
		Range	Average
		Dollars	Dollars
Dairy	30	3,830 - 17,950	9,100
Vegetable-potato	12	2,075 - 16,240	6,206
Potato	12	2,745 - 14,500	8,138
Poultry	11	1,425 - 8,900	4,697

In interpreting these differences a reader must bear in mind the information which has already been given, such as the fact that dairy farms had the largest cleared acreage and were mostly full-time farms; that vegetable yields were unusually low in 1947; that vegetable-potato farms had only about half the acreage of dairy farms; and that poultry farms had fewest crop acres and were mostly part-time operations. Moreover, as noted later, the farm prices of milk, veal, and beef, had increased during the postwar period whereas the prices of eggs, potatoes, and vegetables, had fluctuated but shown no upward trend. Differences in gross income in 1947, therefore, would not lead to the conclusion that such differences are wholly attributable to the type of farm enterprise.

Gross income on dairy farms ranged from $3,830 to $17,950, and averaged $9,100. Only 13 percent of the dairy farms had less than $5,000 and 43

10/ Value of game and fish consumed on the farm was not estimated because data were incomplete. The combined value on some farms was substantial. Twenty of the dairy farmers reported an average of more than 320 pounds of meat from wild game or salmon. Several reported only 40 to 50 pounds of salmon but 9 reported over 400 pounds of wild meat and fish. Two had 750 pounds each. One good-sized family had nearly 1,500 pounds of wild game and fish. Nearly half the dairy farmers reported 30 to 150 quarts of native berries processed. Almost half the other interviewed farmers reported taking moose, caribou, or salmon; some got all three. Twenty-one farmers, exclusive of dairy, had an average of 475 pounds of game or fish--mostly game. In addition to supplying food, hunting and fishing are good sport and recreation. One operator said he came to Alaska to hunt and fish but had been too busy making a living to do either.

11/ Information on gross income was obtained from 65 of the 78 surveyed farms. Income data on the other 13 were incomplete and were not used in the following analysis.

percent had $10,000 or more (table 12). On vegetable-potato farms gross income ranged from $2,075 to $16,240, and averaged $6,206. In contrast with dairy farms, 50 percent had less than $5,000 and only 17 percent had $10,000 or more.

Gross income from potato farms ranged from $2,745 to $14,500 and averaged $8,138. It was $7,500 or more on nearly 60 percent of them. Less than one in 10 of the poultry farms had a gross income of $7,500 or more.

Table 12.- Gross income on 65 farms, by types of farms, Matanuska Valley, Alaska, 1947

Income group	Type of farm: Dairy		Vegetable and potato		Potato		Poultry		Total	
	Number	Pct. of total	Number	Pct. of total	Number	Pct. of total	Number	Pct. of total	Number	Pct. of total
Under $2,500	0	0	2	17	0	0	1	9	3	5
$2,500-$4,999	4	13	4	33	4	33	5	46	17	26
$5,000-$7,499	8	27	3	25	0	0	4	36	15	23
$7,500-$9,999	5	17	1	8	5	42	1	9	12	18
$10,000 or more	13	43	2	17	3	25	0	0	18	28
Total	30	100	12	100	12	100	11	100	65	100

Returns from farming in Alaska compared with the States:- Estimates of cash receipts in the States were $5,080 per farm in 1947. This figure is roughly comparable with the $6,404 farm cash receipts for the 65 farms in Alaska. Gross income (excluding rental value of farm home) per farm in the States was $5,598 compared with $7,041 for the 65 Alaska farms.

Several things need to be considered in interpreting these comparisons. First, prices are higher in Alaska, so farm investment and current expenses are higher than in the States. Prices of things needed for family living likewise are more costly, consequently more dollars are needed in Alaska than in the States to support a family at a given level of living.

Risks both physical and economic are greater for the Alaskan farmer than for the average farmer in the States. In addition to weather hazards, the Alaskan farmer's supply line for equipment, and for much of his livestock feed and supplies, is long and beyond this control. The market for his products is local and recently has been dependent to a large extent on military, railroad, road, and other construction activities, largely done by public funds.

Farms in Matanuska Valley are favorably located with respect to the principal Alaskan market - Anchorage. The Valley contains a relatively large body of the comparatively better soils in Alaska. It is perhaps the largest in the Territory. The Federal Government cleared much of this land, built most of the farm buildings, and subsequently wrote off much of the cost. This favorable set of circumstances is not duplicated elsewhere in Alaska, at present.

Crop yields in 1947 were below average, but offsetting this was the boom-time situation and high prices, which was more pronounced than in the States. It is the considered judgment of the writers that neither a new settler nor an experienced one can safely expect to continue in such a favorable position over the long pull. It is further emphasized that most of the interviewed farmers were experienced in the ways of farming in Alaska. They know the climate and the land. They know how to handle their land and how to time their operations to meet the hazards of cold-climate farming. They remember and often refer to the difficult times they had before the period of high prices and expanding markets which began about 1942. This study does not support the thesis that opportunities for earning money by farming in Alaska generally are more attractive than in the States. On the whole they appear to be decidedly less.

Sources of income for four types of farms are shown in table 13. Sales of milk accounted for 64 percent of the gross income on dairy farms. Sales of crops make up 75 percent of the gross on vegetable-potato farms and 63 percent on potato farms. Sales of eggs accounted for 40 percent of the gross income on poultry farms.

Work off the farm was a significant part of the gross income on potato and on poultry farms. It was 17 and 22 percent, respectively, of the total. Half the potato farms had from $1,100 to $3,600 of off-farm income. Four of the 11 poultry farms had off-farm incomes ranging from $1,640 to $3,500.

Off-farm income was small on dairy farms. Only three of them received over $500 from this source; and only four others had any off-farm income. All 30 of the dairy farmers were classed as full-time operators.

Net income, as used here, is the gross income as defined above minus farm expenses, and with allowances for inventory changes. Data obtained on net income were less satisfactory than those on gross income. Major farm receipts could be checked with sales records at the cooperative organization or other sales-agency records, but there was no such way of checking farm expenses. Few farmers kept formal cash accounts. Farmers were asked in detail regarding farm expenses and willingly gave their best estimates. Farm expenses subtracted from gross income include expenses for feed, hired labor, interest paid, property taxes, seed, fertilizer, electricity for farm use, tractor fuel, and other cash farm expenses. They also include depreciation on farm buildings and equipment and decreases in livestock inventory.

Net income represents income that became available to the farm family, and was available for family living, for retiring debt, and investment. It includes the value of farm products used in the household; in addition the family had a house to live in and the fish and game that they obtained.

Table 13.- Average gross income from 65 farms in the Matanuska Valley, Alaska, 1947

Source of income	Type of farm								Average
	Dairy		Vegetable-potato		Potato		Poultry		
Number of farms	30		12		12		11		65
	Dols.	Pct.of total	Dols.	Pct.of total	Dols.	Pct.of total	Dols.	Pct.of total	Dols.
Crops	1,039	11.4	4,648	74.9	5,098	62.6	598	12.7	2,380
Livestock	456	5.0	83	1.3	154	1.9	224	4.8	292
Poultry	32	.4	121	2.0	5	---	168	3.6	67
Milk	5,838	64.1	---	---	21	0.3	---	---	2,698
Eggs	397	4.4	49	0.8	675	8.3	1,893	40.3	637
Other livestock products	157	1.7	125	2.0	14	0.2	23	0.5	102
Other	217	2.4	561	9.0	80	1.0	58	1.2	228
Farm cash receipts	8,136		5,587		6,047		2,964		6,404
Products for home use	663	7.3	461	7.4	676	8.3	713	15.2	637
Gross income from farm	8,799		6,048		6,723		3,677		7,041
Work off farm	98	1.1	158	2.6	1,385	17.0	1,020	21.7	503
Custom work	203	2.2	---	---	30	0.4	---	---	99
Total gross income	9,100	100.0	6,206	100.0	8,138	100.0	4,697	100.0	7,643

To keep a clear understanding of the net-income figures shown here the reader will remember that interest payments on farm indebtedness are included in the costs. It should be made clear at the same time that interest payments per farm were relatively low. They would have been much higher had it not been for the debt-adjustment program in 1937 at which time debts on 44 farms were reduced more than $7,000 per farm. More about this debt reduction is given later.

Net income averaged $4,427 on dairy farms and $4,706 on potato farms (table 14). Although the average net return to dairy farmers was nearly $300 less than that to potato farmers, fewer of them received less than $3,000--26 percent, as compared with 33 percent on potato farms. The same number, but a smaller percentage, of dairy farmers netted $6,000 or more.

All of the 30 dairy farmers and 6 of the potato farmers were full-time farm operators. Four of the latter group received more than $6,000 each, ranging up to nearly $8,800, but the other two received $3,500 or less per farm. Three dairy farmers netted over $8,000 in 1947, ranging to more than $10,500.

Table 14.- Number and percentage of dairy and potato farms by income groups, Matanuska Valley, Alaska, 1947

Net income	Type of farm			
	Dairy		Potato	
	Number	Percent of total	Number	Percent of total
Under $2,000	1	3	3	25
$2,000 - $2,999	7	23	1	8
$3,000 - $4,999	13	44	1	8
$5,000 - $5,999	5	17	3	25
$6,000 or more	4	13	4	34
Total	30	100	12	100
Average	$4,427		$4,706	

Information on net income is not available for enough farms of the other types to justify showing the summary. As would be expected from the gross income figures (table 13), average net returns on vegetable-potato farms and poultry farms were well below those on dairy and potato farms. On 7 vegetable-potato farms it ranged from $1,100 to $9,400, and averaged $3,055. The average on poultry farms is still lower, around $2,500; the maximum was around $4,400.

Dairy Farming

Dairy farming is expanding in the Valley. In terms of total value of production, acreage of cleared land, and number of full-time farmers, dairying is the dominant type of farming in the area. There were 35 Grade A dairies in 1947 and perhaps 40 in 1948. The principal breeds of cows are Holstein and Guernsey. Contrary to the earlier practice of buying in the States, almost all replacements now are grown locally.

Much of the grain for cattle is imported from the States. This practice will continue until more land is cleared. Prices for grain are high but the dairy farmers' first call on the land is for the production of forage for it is more economical to ship in grain than the bulky hay.

Figure 3.- Holstein cow and field of oat-pea-vetch hay.

Production.- About 2.5 million pounds of Grade A fluid milk were sold in 1947. Sales in 1948 were expected to be larger. Records of 30 dairy herds ranging from 4 to 20 cows, a total of 325 cows, had an average production of 7,200 pounds per cow. Tests of milk fat were not obtained for individual herds but the average for milk received by the Cooperative was approximately 4 pounds of butterfat to 100 pounds of milk. Butterfat production was around 288 pounds per cow. This includes the quantities used in the household and on the farm, as well as milk sold. Data on quantities sold were obtained from the Matanuska Valley Farmers' Cooperating Association. Farm and household use was estimated by the farmers.

Feed inputs.- The feed inputs given are estimates obtained from 30 dairymen. These men generally did not measure nor keep records of quantities of dairy feeds produced, bought, or fed.

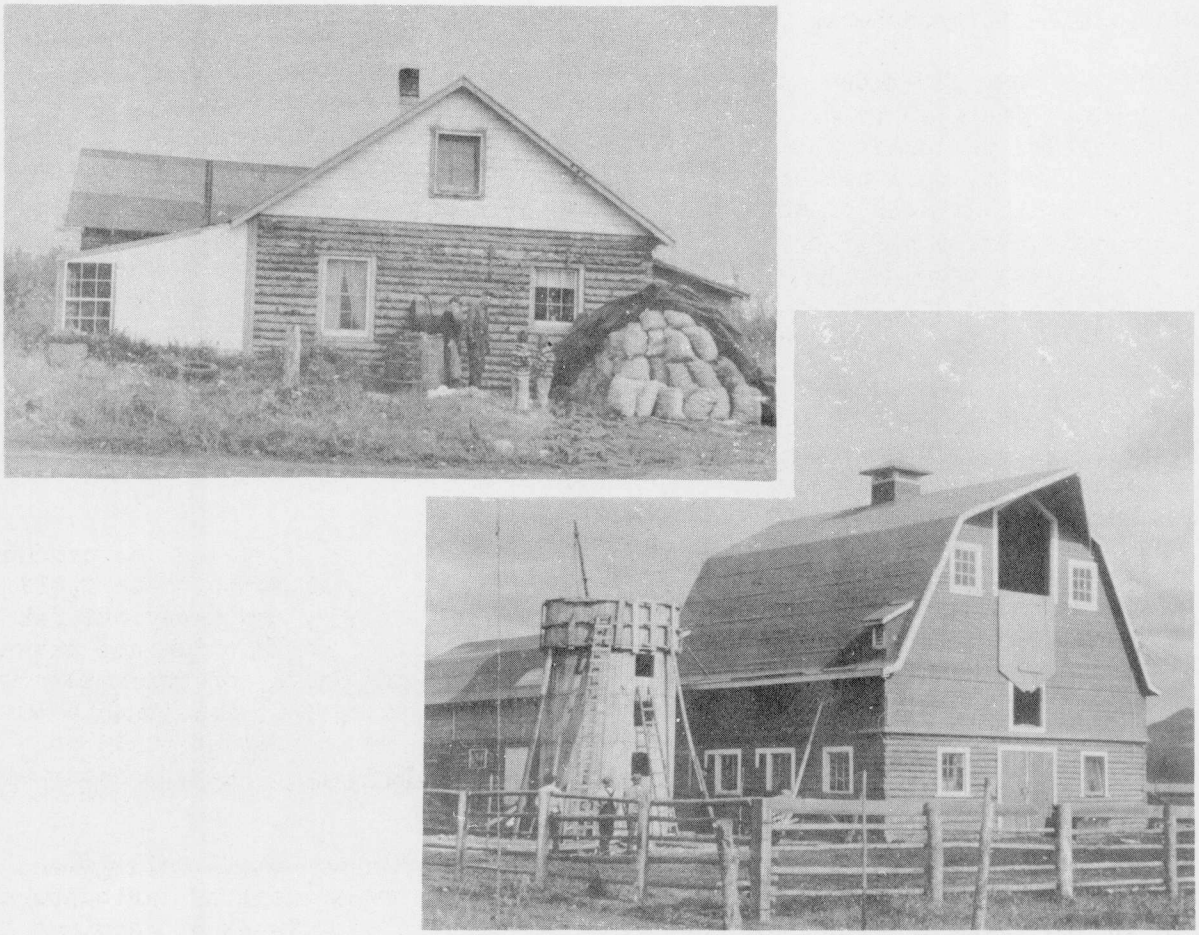

Figure 4.- House and barn in Matanuska Valley built under colony auspices. Potatoes in sacks are ready for storing in cellar under the house and the silo is under construction. Matanuska Valley dairymen are increasingly interested in silage.

Concentrates.- Estimates of concentrates fed are considered by the writer to be fairly accurate. The farmer estimated the quantity fed per day, week, month, or year, for 1 cow or for his herd. The quantity of dairy feed bought was obtained from some farmers and the cost of dairy feed was had from most of them. In some instances the quantities of dairy feed bought were ascertained by dividing the total cost of feed bought by the average price. Estimates covering the 30 herds indicate an average input per cow of 2,250 pounds of concentrates; this includes wastage and loss in farm storage and feeding. Most of the concentrate was mixed dairy ration bought from the Cooperative.

Pasture.- The pasture season, including pasture on stubble after harvesting of hay and silage, generally extends from the first part of May into October--about 5 months. Full pasturage, however, usually is obtained for only 3 months or even less. A long period of feeding with full winter rations is necessary for profitable milk production in this area. Economical sources of winter feed and improvements in pasture to provide more feed for longer periods in summer are greatly needed. Development and general adoption of a hardy winter legume would be a big boost to local milk producers.

The estimated number of cow months of full-pasturage equivalent ranged from 2.9 to 5. A few dairymen, through a pasture program which included perennial pastures and annuals used for pasture, reported 4.5 to 5 months of full pasturage. The estimated average for the 30 herds was 3.6 months. Half of this was from seeded pasture which yielded 1.9 cow months per acre. The other half was from stump and woodland pasture and aftermath from hay and silage fields. As grain is fed throughout the pasture season, the term full pasturage, as used herein, means that cows obtained from pasture all feed except grain. Grain feeding during the months of full pasturage ordinarily is not so heavy as during other seasons. The average quantity of concentrate fed per cow month, throughout the year, was 187 pounds. Average quantity fed during the pasture period apparently was about 80 percent of the annual average rate, or around 150 pounds per cow.

Total digestible nutrients, required for a 1,200-pound cow producing 7,200 pounds of milk in the Pacific Northwest, is estimated to be 6,837 pounds. (Maintenance 3,391 gain including fetus 530, and 4-percent fat corrected milk at 0.324 plus 25 percent for excess consumption and wastage 2,916 lbs.) 12/ This would average 570 pounds per month, of which 60 pounds would be excess consumption and wastage. As wastage is less when cows are on pasture it is estimated that TDN per cow while on pasture would be 525 pounds--420 from pasture and 105 from 150 pounds of dairy concentrate.

12/ United States Bureau of Reclamation, Washington State College and Agricultural Experiment Station, United States Department of Agriculture, and Pacific Northwest Regional Planning Commission. Types of Farming, Columbia Basin Joint Investigations. Problem 2. Washington, D. C., Bur. Reclam. 1945.

Based on the above assumptions it is estimated that pasture in the Matanuska Valley furnished 420 TDN per month for 3.6 months or a total of 1,512 pounds per cow.

Hay and silage.- Because of colder winters, body maintenance in the Valley probably would be greater than in the Pacific Northwest. If we estimate TDN requirements of 7,000 pounds per cow in Matanuska, TDN obtained from hay and silage would amount to 3,913 pounds per cow year (7,000 - 3,087). Hay and silage available to stock from the 1947 crop in the Valley is summarized as follows:

	Total production (Tons)	Loss in harvesting and storage (Percent)	Net production fed to dairy		
			Total (Tons)	Per cow unit (Tons)	TDN
Hay	1,398	10	1,258	3.11	2,861 lbs.
Silage	1,208	5	1,148	2.83	962 lbs.
Digestible nutrients from hay and silage					3,823 lbs.

Only about two-thirds of the dairy farmers put up silage in 1947, though others cut and fed some feed green. But several new silos were being constructed in 1948. The difficulty of curing and storing hay and the fact that silage furnishes more feed units per acre than hay, plus the need for a palatable succulent winter feed, are potent influences in the shift to silage. Oats and peas together, or oats, peas, and vetch, are the main hay and silage crops but however, there was considerable interest in using grass as a silage crop.

Acres of cleared land required per cow.- The acres of cleared land required to fully support a dairy cow under 1947 conditions in Matanuska Valley is estimated as follows:

Hay	2.90 acres x 1.2 tons minus 10% loss = 3.13 tons	or 2,880 lbs. TDN
Silage	.65 acres x 4.6 tons 13/ minus 5% loss = 2.84 tons	or 966 lbs. TDN
Pasture	1.65 acres x 1.9 cow months x 420 =	1,316 lbs. TDN
Pasture	(3.55) acres aftermath from fields .5 cow mo. x 420	210 lbs. TDN
Subtotal	5.20 acres	5,372 lbs. TDN
Grain	1.60 acres x 1,300 = 2,080 lbs.	or 1,456 lbs. TDN
Total	6.80 acres of cleared land or equivalent	6,828 lbs. TDN
Protein concentrate purchased		100 lbs. TDN
Total		6,928 lbs. TDN

13/ This figure includes estimates of yields on farms where forage is cut and fed direct from the field. The yield shown in table 9 excludes these farms.

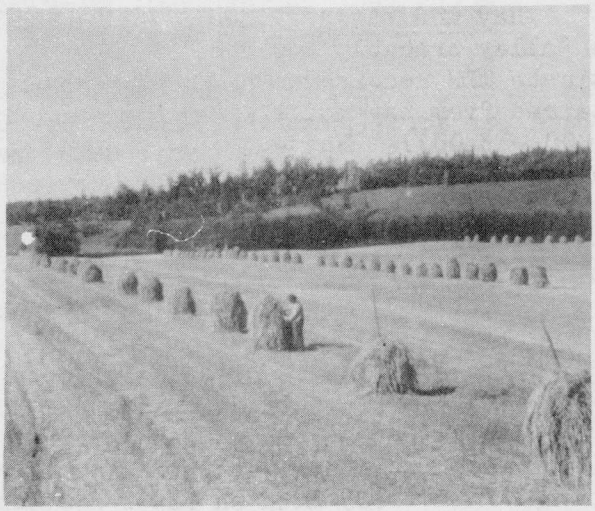

Figure 5.- Bundled oats in shocks and oat-pea hay curing on stakes. Curing in bundles is becoming more common than curing loose on stakes.

In addition to the 6.8 acres per cow, 1.2 acres were needed to produce feed for bulls and young stock, making a total of approximately 8 acres of cleared land or its equivalent per cow in the milking herd.

A record of yields over the years is not available, but if hay and silage would yield 1.7 and 5.8 tons, respectively, and grain 1,700 pounds, (the reported usual yields) the acres needed per cow would be around 5.5 and per cow unit about 6.5 acres.

Hours of work required for dairy cows and feed crops.- Caring for dairy cows took an average of slightly more than one-third of an hour per cow each day in summer and slightly more than half an hour per cow in winter. The daily average over the year was 0.45 of an hour. The total for a year is 164 hours per cow (135 days @ 0.337 hours plus 230 days @ 0.514 hours).

Hours of work for feed crops are shown in table 15. Nearly all of the grain, hay, and silage, is cut with a binder. Grain and hay are then shocked and left to cure for threshing or stacking. The silage is cut and hauled to the ensilage cutter for cutting and storing. Excluding labor for spreading manure, the man hours per acre for producing, harvesting, and storing, averaged 8.1 hours for grain, 7.9 hours for hay, and 11.3 hours for ensilage.

Table 15.- Typical input data for small grains (including hay and silage), Matanuska Valley, Alaska

Planting dates: May 10-20 (up to late June)
Harvesting dates: Silage- Sept. 1; Hay-Sept. 10; Grain-Sept. 20.
Seed per acre (pounds): Wheat-100; Oats-100; Barley-100;
Hay: Oats, peas and vetch -- 100 pounds, 20 and 10, respectively.

Twine per acre: 2 pounds for grain; 3 pounds for silage or hay
Usual yields: Hay, 1.7 tons; silage, 5.8 tons; oats, 42.7 bu.; barley, 35.1 bu.; wheat 23.9 bu.

Fertilizer: Nitrate of soda or ammonium nitrate was applied on a number of fields at the rate of 100 pounds per acre. A few farmers used 100 pounds of 43 percent phosphate per acre. Most of the manure was put on small grains or hay.
(No data on labor for manure applications.)

Operation	Man hours per acre
Plow	1.0
Disc	.6
Harrow	.4
Seed and fertilize	.6
Cultipac	.4
Preharvest	3.0
Bind	1.3
Shock	1.4
Thresh	2.4
Store hay	2.2
Store ensilage	7.0

Stateside labor comparisons for oats (threshed): 14/

	Preharvest	Harvest	Total	Yield
East No. Central States	3.6	6.1	9.7	30 bus.
Wisconsin	5.8	7.0	13.8	31 bus.

14/ Cooper, M. R., Holley, W. C., Hawthorne, H. W., and Washburn, R. S. Labor Requirements for Crops and Livestock. Bur. Agr. Econ. F. M. 40. 1946. (Processed.)

Milk-feed price ratios.- Milk prices in Alaska have been high relative to those in the States but they generally were less favorable relative to the prices of feed than in the States (table 16).

Table 16.- Milk-dairy ration price relationships, Palmer, Alaska, selected areas, and the United States

Year	Cost 100# dairy ration at Palmer 1/	Price 100# milk at Palmer 2/	Milk-feed price ratio			
			Palmer 3/	Western States 4/	West North Central States 4/	United States 4/
	Dollars	Dollars				
1940	3.00	4.30	1.43	1.30	1.55	1.29
1941	3.50	4.30	1.23	1.40	1.65	1.39
1942	3.80	4.73	1.24	1.40	1.54	1.32
1943	4.50	6.12	1.36	1.43	1.52	1.35
1944	5.10	6.50	1.27	1.41	1.55	1.38
1945	5.10	6.61	1.30	1.42	1.62	1.42
1946	5.70	7.28	1.28	1.35	1.56	1.38
1947	6.75	7.03	1.04	1.18	1.21	1.18
1948	7.00	5/ 8.85	1.26	1.23	1.32	1.25
Average	4.94	6.19	1.25			

1/ Taken from sales slips of the Matanuska Valley Farmers' Cooperating Association.

2/ Taken from summaries and reports of the M.V.F.C.A.

3/ Pounds of dairy ration (concentrate) equal in value to 1 pound of whole milk.

4/ Pounds of concentrate ration equal in value to 1 pound of whole milk. From United States Bureau of Agricultural Economics Rations Fed to Milk Cows. Annual.

5/ Price through September 15, 1948.

Except in 3 years since 1939, 100 pounds of milk in Alaska would pay for 8 to 16 pounds less feed than in the United States. In 1940, 100 pounds of milk would pay for 14 pounds more feed in Alaska than in the United States. The difference in favor of Alaska in 1943 and 1948 was 1 pound. Much of the grain and all of the mixed dairy rations were imported from the States, nevertheless dairy farming in Alaska has expanded gradually. In 1948, additional farmers were making plans to begin the production of Grade A milk.

Marketing dairy products.- The Matanuska Valley Farmers' Cooperating Association was the market outlet for milk produced in the Valley which was sold as fluid milk, mostly in Anchorage. The Association hauled fluid milk from its assembly station at Palmer to its bottling plant at Anchorage in a tank truck. Production in 1947 and 1948 was insufficient to meet the current demand. There was opportunity for considerable expansion.

Matanuska dairymen did not have a monopoly on this milk market. Consumers in Anchorage obtained milk from several sources and in several forms. They paid 55 cents for a quart of Matanuska milk in a glass bottle (15¢ bottle refund), or 55 cents for a quart of air-borne milk in a paper carton from Seattle, or 40 cents for a quart of reconstituted milk (15¢ bottle refund) made from skimmilk powder and frozen cream shipped from Seattle, or 20 cents for a can of condensed milk.

A Dairy Farm

The following summary of organization, production, income, and expenses is for a full-time specialized dairy farm. This farm is above average in terms of yields, production, and income, but is not exceptional since income on some other dairy farms was higher in 1947. It is a colony farm that has expanded from the original 40 acres to 115. Total land cleared by the end of 1947 was 65 acres; 53 acres were in annual crops, and 12 were seeded to pasture, or about 5 acres per cow milked. This acreage is not enough to supply all feed for the dairy herd. However, it furnished enough hay and silage, which get priority over grain that can be imported more economically than hay, and about two-thirds of the grain needed to carry the herd for a year. In 1947, nearly all the grain used was purchased as there was no carry-over from the 1946 crop.

Crops.- The cropland on this farm is used almost entirely for producing feed. Almost half the dairy farmers follow this practice. Yields on this farm (table 17) were somewhat higher than the averages for the area. Yields of mixed grain (barley and oats) in 1947 were well above average for this farm and for the area. Grain and pasture land is fertilized annually. In 1947, 43 percent treble superphosphate at the rate of 100 pounds to the acre was put on the grain, and 100 pounds of ammonium nitrate was applied to the pasture. Barnyard manure at the rate of about eight loads per acre was put on 15 acres of the oats and peas.

Livestock.- An average of 13 cows were milked during the year. On January 1, 1947, the herd consisted of 12 cows and 5 heifers. Herd replacements were selected from farm calves. Artificial insemination was practiced, at a cost much less than keeping a bull on the farm.

Table 17.- Production and disposition of crops on a 13-cow dairy farm, Matanuska Valley, Alaska, 1947

Crop	Acres	Production			Disposition				
		Unit	Per acre	Total	Feed	Seed	Sales		
							Amount	Price	Value
									Dollars
Oats and barley	8	Cwt.	33.7	270	233	15	22	8	176
Hay-oats and peas	36	Ton	1.5	54	54	---	---	---	---
Silage-oats and peas	9	Ton	6 2/3	60	60	---	---	---	---
Seeded pasture	12	---	Grazed May 20 to September 1						

Fourteen calves were born during the year; 4 of these were saved for the breeding herd, 4 were sold for a total of $20, and the remainder were killed at birth or given away.

Milk production per cow averaged 9,186 pounds, well above the average for the Valley. A total of 119,415 pounds of milk was produced and its disposition was as follows:

Home use	3,140 pounds
Farm use	3,200 pounds
Sales	113,075 pounds
Total	119,415 pounds

Milk sales were at 8.3 cents per pound and reached a total of $9,374. Milk sales averaged $721 per cow milked. All sales were through the local farmers' cooperative.

Expenses.- Cash outlay for feed is the largest expense item on this farm as well as on most dairy farms in the area. Only seasonal labor was hired but the total labor expense was larger than the average for all dairy farms.

Income.- Both the gross income and the net income are within the range of incomes on other 12 to 15 cow farms. The gross of $10,760, however, is above the average of all surveyed dairy farms, by $1,800. Seventeen dairy farms had a smaller gross income and 12 had a larger.

Net income of $6,808 is the return to the operator and his family for their labor and for interest on the operator's equity in the farm business (table 18). Income in 1947 was above the average of all dairy farms but was not exceptional compared with that from other dairy farms of about the same size.

Table 18.- Financial summary of a 13-cow dairy farm, Matanuska Valley, Alaska, 1947

Expenses	Amount	Income	Amount
	Dollars		Dollars
Cash expenses:		Cash income:	
Purchased feed	2,000	Crop sales	176
Seasonal labor	700	Livestock sales	20
Repairs	783	Milk sales	9,374
Hauling milk	500	A.C.P. payment	105
Veterinary & breeding fees	100	Total	9,675
Seed	200	Non-cash income	
Fertilizer	80	Milk used in home	260
Fuel and oil, farm share	375	Garden products	150
Electricity, farm share	160	Native fruit	25
Interest paid	24	Increase in inventory:	
Insurance and taxes	25	Crops	1,400
Auto license, farm share	5	Livestock	650
Total	4,952	Total	1,085
Non-cash expenses:		Gross income	13,160
Depreciation	400		
Total farm expenses	5,352	Total net income	6,808

Investment.- The operator of this farm has made good progress since he arrived in 1935. His debts now are small and could be liquidated out of available cash reserves. This farm went through the debt-adjustment program at the end of 1937. The total reduction on it was below average, but was more than $6,000. Such adjustments were a real aid to the new settlers. Since then, this operator has bought additional land and paid for it. Another aid to the colony farmers was the original land-clearing contract with A.R.R.C. under which 15 acres would be cleared at $36 per acre. A later contract to clear another 15 acres at $72 an acre was offered the colonists. Some were not willing to pay even this price, but others took advantage of the $72 rate which was roughly half the clearing costs in 1948.

At 1947 price levels, the cash outlay to get a good start toward building up a farm of this size and type would be substantial. Costs of land clearing alone for 65 acres at contract rates would be anywhere from $6,500 to $13,000, or more. Land values per acre in 1947 were lower than the cost of clearing an acre of typical land in the Valley. Original cash investment in the business and estimated values in 1947 are as follows:

	Original cash investment	Estimated value 1947
	Dollars	Dollars
Land and clearing	4,536	8,125
Farm machinery	2,855	1,800
Farm buildings and fences	5,525	8,600
Well (farm share)	800	800
Livestock (inventory)	1/ 4,350	2/ 5,000
Total	18,066	24,325

1/ January 1, 1947.
2/ December 31, 1947.

Much of the machinery on this farm was bought second-hand between 1939 and 1941. The other--including manure spreader, binder, milking machine, and milk equipment--was bought in 1942 and 1943. The buildings and the well date back to 1935 and 1936, but the barn was remodeled during the war to meet Grade A specifications.

Typical Dairy Farm With Potato Enterprise

The Farm just described is a full-time dairy farm with dairying the only enterprise. The one described below is also a full-time unit, with the dairy enterprise smaller than the average for the area. It has also a potato enterprise which provides enough additional work to keep the operator fully occupied, along with considerable work for his two sons.

Potatoes fit in well with the dairy enterprise, particularly when there is some family labor to do part of the work and when enough cleared land is available to grow sufficient hay and silage and still leave some acreage for the potatoes. More than half the dairy farms carried a potato enterprise ranging from less than 1 acre up to 13, with sales ranging from $21 to $6,760. A few of them have a small vegetable enterprise as this one does, but more than half of them having such an enterprise receive a gross of less than $100 from it.

The operator of this small dairy farm came to Alaska after the establishment of the Matanuska Valley colony. He began farming in his present location a few years after the colony was organized. He bought from A.R.R.C. one of the 40-acre tracts which was undeveloped except for buildings. Since then, 26 acres have been cleared. An additional 25 acres of cropland and some woodland pasture are rented to permit full-time farming. His plans include the purchase of a 40-acre tract which would allow him to produce more feed or other crops and establish a permanent pasture.

Crops.- In 1947 crops were grown on 51 acres, 26 of which were owned and 25 rented. Woods and wasteland pasture totaled 94 acres, of which 14 were owned and 80 rented.

Figure 6.- Binding hay and harvesting potatoes in Matanuska Valley. Modern equipment is used on most farms in Alaska.

Yields of hay and silage on this farm were relatively low (table 19). Except for 6 acres of the oats and peas which received all of the available manure, the feed crop was not fertilized. The yields of potatoes were about average and were obtained after the use of 5-10-10 fertilizer at the rate of 300 pounds to the acre. The half-acre of vegetables was fertilized at the same rate.

Table 19.- Production and disposition of crops on a combination dairy and potato farm, Matanuska Valley, Alaska, 1947

Crop	Acres	Production			Disposition				
		Unit	Per acre	Total	Feed	Seed	Home use	Sales: Amount	Sales: Price	Sales: Value
									Dollars	
Oats & peas:										
Hay	30.5	Ton	1.1	34	34	---	---	---	---	---
Silage	8.0	Ton	2.5	20	20	---	---	---	---	---
Pasture	4.0	---	grazed May 20 to September 1							
Potatoes	8.0	Cwt.	125	1000	90	15	5	890	4	3,560
Vegetables	0.5	Dol.	---	---			225			163

Livestock.- At the beginning of 1947 this farmer had 8 mature cows and 3 young heifers (table 20). Along with perhaps 80 percent of the other dairymen in the Valley, he keeps back calves for replacements. He takes advantage of the artificial insemination services. A few chickens are kept, primarily for home consumption. Only 43 dozen of the 343 dozen eggs were sold.

Table 20.- Inventory, production, and disposition of livestock on a typical combination dairy-and-potato farm, Matanuska Valley, Alaska, 1947

Kind	Number Jan. 1	Purchased		Number died	Number for home use	Sales			
		Number	Cost			Number	Pounds dressed	Price	Receipts
								Dollars	
Milk cows	8	---	---	---	.25	.75	375	0.40	150
Heifers	3	---	---	---	---	---	---	---	---
Calves	3	---	---	2	1.00	2.00	225	0.50	112
Calves born	8	---	---	8	---				
Chickens	50	60	30	10	20.00	30.00	---	2.00	60

A total of 51,825 pounds of milk was produced (table 21). An average of 7 cows were milked with a production of 7,403 pounds per cow. Milk sales per cow milked averaged $509.

Table 21.- Production and distribution of livestock products on a typical combination dairy-and-potato farm, Matanuska Valley, Alaska, 1947

Kind	Unit	Production	Home use	Farm use	Sales		
					Amount	Price	Receipts
						Dollars	
Milk	Pounds	51,825	5,840	1,900	44,085	0.08	3,552
Eggs	Dozen	343	300	---	43	0.86	37

Net income--or the amount available to cover interest on operator's equity, retirement of debt, and returns for family living--is about the

same as the average for the 30 dairy farms studied. The returns from cash crops, mostly potatoes, account for a substantial part of the total income (table 22).

Investment.- The owner's investment on this farm is considerably less than that shown on the larger dairy farm discussed earlier. It would be still smaller if the land clearing had been done at the same contract rates as were in effect for clearing the other farm. The investment in land and farm buildings includes the cost of clearing 25 acres at the rate of $125 per acre. The farm machinery investment on this farm is larger than on the other dairy farm, principally because of the recent purchase of a motor truck and tractor. Actually fewer items of equipment are owned. Some of the farming is done either with borrowed equipment or through exchange arrangements with neighbors.

Table 22.- Financial summary of a typical combination dairy and potato farm, Matanuska Valley, Alaska, 1947

Expenses	Amount	Income			Amount
Cash expenses:	Dollars	Cash income:			Dollars
Feed	1,498	Crops			3,723
Seasonal labor	505	Livestock			322
Cash rent	200	Milk			3,552
Repairs	182	Eggs			37
Hauling milk	154	A.C.P. payment			82
Veterinary	12	Custom work			15
Breeding fees	40	Total cash income			7,731
Seed	392	Non-cash income:			
Fertilizer	159	Home use:			
Fuel and oil	321	Milk	- $ 467		
Sacks and supplies	230	Eggs	- 258		
Electricity	154	Garden	- 225		
Interest paid	39	Potatoes	- 20		
License and tax	15	Native fruit	- 15		
Total cash expenses	3,901	Wood	- 60		
Non-cash expenses:		Total		$ 1,045	1,045
Depreciation	461	Gross income			8,776
Total farm expenses	4,362	Net farm income			4,414

This operator did not take part in the debt-adjustment program. He missed the early relatively nonproductive period of the colony when debts were building up so fast for various reasons.

Original cash investment in the business and estimated values in 1947 are as follows:

	Original cash cost to owner	Estimated value, 1947
	Dollars	Dollars
Land and farm buildings	6,000	7,000
Farm machinery	3,900	3,000
Livestock (inventory)	1/ 2,700	2/ 2,700
Total	12,600	12,700
Rented land		4,000
Total	12,600	16,700

1/ January 1947. 2/ December 1947.

Potato Farming

Potatoes have been a basic cash and food crop for new settlers in Alaska. They are still the most important single cash crop in the Territory on both full-time and part-time farms. About three out of four of the farms surveyed in the Matanuska Valley grew potatoes, in 1947. The average acreage on 59 farms was 6.2, ranging from less than 1 to 33 acres. Potatoes were the major enterprise on 12 farms, but the average acreage on these was only 12. Three of these 12 potato farms had 20 or more acres, in 1947.

Yields.- Yields of potatoes in Alaska are not high. In 1947 the yields on the Valley farms studied averaged 5.2 tons per acre. Yields in the Valley were lower than usual on most farms that year, but five farmers reported yields above 7 tons per acre. One reported more than 11 tons. Farmers' estimates of usual yields averaged 6.2 tons per acre. Potatoes of better quality and better yields may be expected on the sunny south and east slopes. These slopes, as contrasted with bottom lands, are likely to be better drained and less subject to early frosts which reduce both quality and yield. Production of certified seed potatoes has a good start in Alaska and can do much to improve quality and keep damages from disease at a minimum.

Production practices.- Producing and harvesting potatoes in Alaska takes about 57 man hours per acre, on the average. The distribution of this time is shown in table 23. Tractor power is used on all commercial farms. The potato harvester or "picker-upper" is used on some farms. At least 12 of these machines were in the Valley, 5 of them on potato farms.

Practically all growers apply mixed fertilizer to their potato land--mostly 5-10-10 or 5-10-5, varying from 250 to 1,000 pounds to the acre. The common application was 400 pounds. Treble superphosphate was used by a few farmers. Some farmers bought fertilizer and mixed it on the farm in varying proportions of nitrogen, potash, and phosphorus.

Diseases are more serious in Alaska potato production than is generally recognized. Although there has not been a complete potato failure caused by diseases, Dr. C. L. Lefebvre, plant pathologist of the United States Department of Agriculture reports in correspondence 15/ with the writer: "I doubt whether there was a single potato field in the Matanuska Valley in 1948 that was free of blackleg, rhizoctonia, and several of the mosaics. Just how much loss disease caused is difficult to say, but many farmers are unable to recognize the mosaics, but they may still cause a 5 to 25 percent reduction in yield. We considered blackleg serious in the Matanuska Valley in 1948 . . . .". In 1947, spots were seen in some fields, with about 25 percent of the plants infected. In addition to reducing yields the disease can cause serious losses to potatoes after they are in storage. Several farmers in 1948 could not have their seed potatoes certified because of the presence of ring rot.

15/ June 15, 1949.

Figure 7.- Potato and cabbage fields in the Matanuska Valley.

Markets and marketing.- Major limiting factors in profitable production of potatoes are the size of market and competition from imported potatoes. It is reported that, because of a tight market, some potatoes were dumped in the river on one occasion. In recent years the market has expanded and prices have been generally favorable to the producers. The 1941-48 average price of potatoes received by farmers was $4.19 for 100 pounds. Year-to-year prices were erratic, fluctuating between $2.00 in 1945 to $6.00 in 1942, as follows:

1941	$4.00	1945	$2.00
1942	6.00	1946	3.00
1943	5.00	1947	4.77
1944	4.75	1948	4.00

Most potato growers and local retailers realize the necessity of improving the quality of Alaskan potatoes if they are to have a favorable place in the market. Unless quality is improved or prices are reduced relative to price of outside potatoes, there is little immediate prospect for a significant increase in sales of Alaska-grown potatoes. But these are not insurmountable obstacles. Certainly Alaskan farmers can grow enough to meet the needs of the local market if storage facilities and practices to permit keeping the crop from one year to the next are developed. Circular No. 7 of the Alaska Agricultural Experiment Station 16/ points out "The Alaska climate, however, makes better-than-average storage and management necessary to insure a continuous supply throughout the year."

"Storage capacity and storage of suitable types for holding potatoes from one crop to the next are inadequate at present in the Matanuska Valley." Satisfactory storage facilities were not available on many farms in 1947 and only a few farms were equipped to wash potatoes. A community potato storage with a capacity of approximately 900 tons was operated by the produce department of the Matanuska Valley Farmers' Cooperating Association. This storage was not considered satisfactory by many growers because spoilage was frequent. Washing facilities were available at this storage.

The major market for potatoes grown in this Valley is the United States Armed Forces, mining companies, construction companies, the Alaska Road Commission, and the Alaska Railroad. These consumers use large quantities and solicit bids from the grower organizations for delivery. The Army contract is the most highly-prized potato market. This contract for the 1948 crop was bid in by the Matanuska Valley Farmers' Cooperating Association at $4.18 per hundredweight, delivered in Fort Richardson. This contract was for 25,515 hundredweight and was estimated to represent slightly more than one-half of the potato crop of the Valley. A contract with the Alaska Railroad for 1,800 hundredweight was taken by two large growers in the Anchorage area at a price of $4 per hundredweight. Direct sales to stores and restaurants are also made by the two cooperatives, the commission agent, and individual growers.

Satisfactory marketing machinery for moving locally-grown potatoes to private homes through retail stores and to restaurants has not been developed. Several store and restaurant operators expressed a reluctance to deal directly with most individual growers because their experience seemed to show that they could not be assured of uniform quality and grading. Lack of continuity of supply was given as another reason.

16/ Edgar, Alfred D., and Irwin, Don. Potato Storage in Alaska's Matanuska Valley. Alaska Agr. Expt. Sta. Cir. 7, 1948.

Table 23.- Typical input data for potatoes - Matanuska Valley, Alaska

Seed per acre	750 pounds
Planting dates	May 15-20
Harvesting dates	Sept. 15-25
Fertilizer	400 lbs. 5-10-5 or 5-10-10
Usual yield	126 cwt.

Operation	Man hours per acre
Plow	1.4
Disc	.6
Harrow (.45 x 3)	1.35
Cut seed (.6 x 7.50)	4.20
Plant and fertilize	4.6
Cultivate (.75 x 3)	2.25
Hill (1.2 x 2)	2.4
Weed and hoe	8.7
Preharvest	25.50
Harvest	1/ 31.3

Stateside comparisons 2/	Preharvest	Harvest	Total man-hours per acre	1930-39 average yield
Matanuska Valley	26	31	57	126 (usual)
U. S.	37	31	68	61 cwt.
Minn.	29	29	58	46 cwt.
N. J.	29	36	65	101 cwt.
Idaho	36	40	76	134 cwt.

1/ Does not include sorting, but includes hauling to central storage in Palmer.

2/ Cooper, M. R., Holley, W. C., Hawthorne, H. W., and Washburn, R. S. Labor Requirements for Crops and Livestock. Bur. Agr. Econ. F. M. 40. 1946.

A few growers successfully sell both vegetables and potatoes directly to stores and restaurants and make delivery two or three times a week. They have established reputations for consistently delivering high-quality products. Potatoes sold by these growers are washed and carefully graded.

Comments by housewives, restaurant owners, store managers, and growers, indicate that there is great variation in the quality of Alaska-grown potatoes. Some were satisfied, and a few expressed a preference for them. Others preferred potatoes grown in the States. Consumer preferences for potatoes from Alaska compared with those from the States were discussed with several store owners. They pointed out that from 2 to 10 sacks of outside potatoes were sold for each sack of local potatoes, when they were offered at the same price. Unwashed local potatoes were especially hard to sell. The criticisms of local potatoes most frequently given were "soggy" and "have a dark color when cooked." Restaurant operators especially reported that they could not use local potatoes satisfactorily to make "french fries."

A wide variation from time to time in the cooking qualities of local potatoes was reported by store managers and housewives. Some growers believed that varieties, quantity of commercial fertilizer used, time and methods of hilling, location of fields, and storage practices, had an important bearing on quality in potatoes.

A Potato Farm

The 12 potato farms studied were not a uniform group in terms of size and organization. And only half the operators worked full time on the farms, the others had either part-time or full-time nonfarm jobs. No one farm is typical of the group, but one has been selected for description to illustrate some aspects of potato farming.

Crops and land use.- The farm selected had 20 acres of potatoes and some vegetables, as is common on potato farms. These and other crops are listed in table 24.

Table 24.- Production and disposition of crops on a potato farm, Matanuska Valley, 1947

Crop	Acres	Production			Disposition					
		Unit	Per acre	Total	Home use	Feed	Seed	Sales		
								Amount	Price	Value
Wheat	8	Bu.	12	96	---	81	15	---	---	---
Oats	12	do.	25	300	---	150	150	---	---	---
Barley	8	do.	16	128	---	115	13	---	---	---
Hay: Oat-pea	11	Ton	2.0	22	---	22	---	---	---	---
" "	25	do.	1.4	35	---	35	---	---	---	---
Potatoes	20	do.	4.75	95	1	2.5	6	85.5	$ 91	$7,780
Cabbage	0.5	Lbs.	14,784	7,392	---	---	---	7,392	.048	355
Lettuce	0.5	do.	4,304	2,152	---	---	---	2,152	.072	155
Seeded pasture	8	---	---	---	---	---	---	---	---	---

Yields on this farm were not exceptional. Yields of potatoes were below the Valley's average. Manure at the rate of 6 loads per acre was applied to 10 acres of the hay land. Eleven acres of hay received ammonium phosphate at the rate of 70 pounds per acre. The 20 acres of potatoes received 5-10-10 commercial fertilizer at the rate of 600 pounds to the acre.

The operator of this farm settled on one of the 40-acre colony farms in 1935. Since then he has acquired 160 additional acres. Starting with raw land, he had 93 acres cleared by the end of 1947. The remainder was in farmstead, woods, and brush. The farm is large enough for economical operation as a potato farm and it could be operated either as a combination potato-dairy farm or a straight dairy.

Livestock and livestock products.- No milk was sold from this farm in 1947, but the foundation for a dairy herd would permit shifting into Grade A milk production if the barn were remodeled to meet territorial sanitary regulations. Numbers and disposition of livestock on this farm are shown in table 25.

Table 25.- Inventory, production, and disposition of livestock on a potato farm, Matanuska Valley, Alaska, 1947

Kind	Number Jan. 1	Number born	Purchased		Number died	Number for home use	Sales		
			Number	Cost			Number	Price	Receipts
Milk cows	4	--	1	150	--	1	1	200	200
Heifers	3	--	--	--	--	--	--	--	--
Calves	9	7	--	--	6	1	2	10	20
Steer	1	--	--	--	--	1	--	--	--
Bull	1	--	--	--	--	--	--	--	--
Chickens	150	--	--	--	10	40	--	--	--
Hogs	--	--	2	30	--	1	--	--	--

The quantity of milk produced on this farm was not ascertained, but it is estimated that about $300 worth was consumed in the home. None was sold. Eggs produced were 1,214 dozen, 864 dozen of which were sold at an average price of 98 cents a dozen. Those remaining were used at home.

Income and expenses.- More than 77 percent of the cash receipts on this farm were from potatoes. Income and expenses are shown in table 26. Cash available for family living, savings, retiring debts, and for interest on operator's investment was $5,793. In addition, the value of farm-grown food consumed in the home was estimated at $1,064, and the value of farm wood for fuel at $255. This income was for a family of 6, two of whom were under 14 years of age.

Debts. on this farm were reduced by more than $7,500 in 1937, leaving the operator with smaller interest and principal to pay. Debts outstanding were less in 1947 than after the adjustment program, and interest payments were low.

Table 26.- Financial summary for a potato farm, Matanuska Valley, Alaska, 1947

Expenses	Amount	Income	Amount
Cash expenses:	Dollars	Cash income:	Dollars
Rent	278	Crops	8,290
Feed purchased	498	Timber	200
Veterinary	15	Livestock sold	220
Livestock purchased	180	Eggs	850
Seed	82	Conservation payment	115
Fertilizer	871	Hauling	350
Fuel and oil	490	Total	10,025
Seasonal labor	535		
Threshing	21	Noncash income:	
Sacks and containers	300		
Other farm supplies	120	Milk	300
Machinery repairs	178	Eggs	343
Building repairs	500	Meat	230
Interest paid	121	Potatoes	91
Insurance and taxes	28	Garden products	100
License	15	Increase in livestock	
Total	4,232	inventory	400
		Forest products	255
Noncash expenses:		Total	1,718
Depreciation	341	Gross income	11,743
Food for hired labor	50		
Total	391		
Total expenses	4,623	Total net income	7,120

Cash outlay for feed was low. It was mostly for poultry ration. All of the hay and some of the grain was produced on the farm. The cows were fed liberal quantities of hay and very little grain.

Investment.- The $21,640 cash investment on this farm includes purchase prices or costs of land, buildings, and machinery, and estimated inventory value of livestock. The investment in land is chiefly in clearing costs which were much lower than present costs for clearing. Fifteen acres were cleared for $36 an acre, 15 at $72, and the remainder at an estimated $125 an acre. Nearly all the clearing has been done since debt adjustments in 1937. New replacements at 1948 prices for the machinery now on this farm would cost around $5,000.

If the operator chose the alternative of selling Grade A milk additional investment would be needed for barn improvement or a "milking parlor," milk cans, other equipment, and a silo. This alternative is available along with the potato enterprise.

Original cash investment in the farm business and estimated value in 1947 are as follows:

	Cash investment	Estimated value 1947
Land and clearing	$ 9,895	$ 12,695
Buildings and fences	3,900	5,380
Machinery	4,395	3,585
Livestock	1/ 3,450	2/ 3,850
	$21,640	$ 25,510

1/ January 1947 inventory. 2/ December 1947 inventory.

The Vegetable Enterprise

Many cool climate vegetables can be grown in the Matanuska Valley but commercial production of vegetables in 1947 was confined mainly to head lettuce, cabbage, celery and carrots. Vegetables were grown on half the surveyed farms. Cabbage was grown on at least 23 farms, lettuce on 18, celery on 14, and carrots on 9. The average acreage of all vegetables on farms reporting was less than 3 acres (table 8). Only one farm reported more than 10 acres planted to vegetables in 1947. The total acreage planted in 1947 on the 78 farms was 100. The total commercial acreage in the Valley was not learned, but it was estimated to be not much larger than 100.

There are many production problems but marketing is currently the major problem for the Alaskan vegetable grower. Inability of some farmers to sell their vegetables at prices and in quantities they consider satisfactory has convinced them there is not a reliable market for their vegetables. There is little opportunity to sell vegetables except through the two local cooperative marketing associations. Three farmers from the Palmer area have made a success of selling directly to stores and restaurants, but apparently these are the only producers who have found this practice profitable.

The marketing season for most local vegetables is short. Carrots, turnips, and rutabagas can be stored through the winter. Cabbage can be stored and sold perhaps up to Christmas time. But restaurant and store managers have regular supply connections with wholesalers in Seattle for most vegetables and must depend on them during much of the year so they are reluctant to interrupt their Stateside purchases during the short season of local supply.

Local vegetables are usually of high quality, but unfavorable production conditions sometimes result in a lower quality than the Seattle products have. Under these conditions both the housewives and the store managers prefer to buy Seattle products. Store and restaurant managers reported that uncertainty of supply and the period during which local vegetables would be available and the quantities available were the major limitations in the use of local produce.

The small acreages of cleared land on many farms might be expected to force more farmers into truck crops. But the limited or undeveloped market and the opportunities for nonfarm employment, at good wages, have offset considerably any strong tendency in this direction. Most farmers have not found specialized truck-crop production economically feasible under current conditions but should economic conditions become favorable, production could be expanded easily, since both farmsteads and cleared land are available.

Vegetables are a high-risk and intensive crop. Labor requirements are high; and cash costs are high, particularly where much labor is hired and when such plants as cabbage, celery, and cauliflower are bought. The successful growers are usually the specialists with enough acreage to justify nearly full-time attention to the vegetable enterprise.

Cabbage, celery, and cauliflower plants must be started in the greenhouse in Alaska. Some farmers grow their plants and others buy them. In 1947, cabbage and celery plants in small lots sold for $2 to $5 a hundred. At $3 a hundred--the rate reported by several farmers--the cash outlay for plants would be around $900 per acre for celery and $400 for cabbage. One of the largest greenhouses in the Territory quoted the following prices which they have used for the past several years: Celery $30 a thousand, cabbage $20, and cauliflower $30. These prices are for plants ready for field planting.

Further information on prices of plants is given by Don Irwin, Director, Alaska Experiment Stations 17/ as follows:

> The price of vegetable plants varies from year to year. On the average where large orders are grown and taken by the purchaser when small, the price is about ¼¢ each for celery. If they have been transplanted once, the price is on the average about $1.00 per 100 plants. If transplanted to cups and ready for field planting, celery plants average about 3¢ each in 1,000 lots. Cauliflower plants are usually higher in price than cabbage. If taken at about 4½ inch size from hotbeds or coldframes, cauliflower plants average about $4.00 per 100 plants in small lots, $2.50 per hundred in larger lots. Cabbage plants ready for field setting usually cost about $3.00 per hundred in small lots, $2.00 per 100 in larger lots. Much depends on size and thriftiness of plants. Tomato plants, potted and ready to bloom, usually sell for 50¢ each. These are usually about one foot in height. Unpotted plants usually about six inches in height are 15¢ to 25¢ each.

17/ In a letter to O. L. Mimms, April 1949.

Information on the time and cost of producing plants for transplanting is not available, but labor used for other operations and additional data are shown in table 27. The typical yields shown are about what the vegetable growers thought could be expected in most years, rather than averages. Some growers, even in the dry year 1947, had vegetable yields well above those shown. There was complete failure, however, on a small acreage of cabbage, celery, carrots, radishes, rutabagas, and lettuce. Spring droughts, insects, and strong winds when the plants are young, are common causes of low yields or failure of vegetable crops in the Valley. Cut worms do much damage in some years and root maggots damage such crops as turnips, rutabagas, and radishes. Weeds, especially chick weeds, are a problem on some farms.

Because of the short growing season, getting crops off to a good start and providing them with adequate moisture during seasons when precipitation is short, are essential to good yields. In some seasons, especially in the spring, precipitation is inadequate for getting vegetables as well as other crops off to a good start. At such times irrigation, even in small amounts, might result in substantial benefits where soils are suitable and where other necessary practices are carried out. Without use of adapted varieties of crops, adequate use of fertilizer, and the use of other good management and cultural practices, irrigation is not likely to prove satisfactory. A few farmers have irrigated small plots of vegetables to overcome droughts. Others have indicated a definite interest in irrigation, and emphasize the need for lower-cost power for pumping the water. 18/

Too few enterprise records were obtained to provide a reliable basis for computing net returns for the enterprise or average net incomes for all vegetable farms. Net income in 1947 was computed for 7 farms,

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18/ Research and experience are now too limited for adequate appraisal of the future use and value of irrigation in Matanuska Valley. Development is likely to be on the small-scale, individual-farm basis, or possibly on the basis of small groups of farms cooperatively using a water supply. Although it may be possible to develop other types of projects, it is believed that most of the water will be obtained by pumping, primarily from wells but in some cases from nearby lakes and streams. Wells are available on most farms in the Valley, but 9 holes were drilled on one farm to depths of 75 to 510 feet, without finding adequate supplies of water. In addition, the depth of wells varies greatly. Some are as shallow as 18 feet and others are well over 350 feet deep. Depth is important in the cost of pumping water and it is particularly important in this area where power rates are high. Obviously cheaper power for pumping would be a big help.

Table 27.- Typical input data for cabbage, lettuce, celery and carrots, Matanuska Valley, Alaska

Item	Cabbage	Lettuce	Celery	Carrots
Planting dates:	May 1	May 20 to June 12	June 1	April 25 to May 10
Harvest dates:	July 20 to Oct. 1	July 16-Oct. 1	Aug. 25-Oct. 1	Aug. 1 to Oct. 1
Seed per acre:	1 pound	3/4 pound	2½ ounces	1 pound
Number of plants per acre:	10,000	---	30,000	---
Usual yields, pounds:	20,000	12,000	20,000	10,000
		Man-hours per acre		
Operation:				
Plow	1.5	1.5	1.5	1.5
Disc	---	.5	.5	---
Harrow	1.7 (Twice over)	3.4 (4 times over)	2.55 (3 times over)	3.4 (4 times over)
Cultipack	.7	.5	.5	.5
Plant	5.0 (set)	8.0	64.0 (set)	8.0
Fertilize 1/	2.0	8.0	20.0	8.0
Cultivate	---	32.0	32.0	40.0
Block, thin and weed	---	24.0	---	3/ 60.0
Weed and cultivate	2/ 30.0	---	---	---
Weed and hoe	---	---	80.0	---
Total preharvest	40.9	77.9	240.0	121.4
Harvest	70.0	100.0	110.0	4/ 100.0
Total hours	110.9	177.9	350.0	221.4
Statewide comparisons: 5/				
U. S.	109 (6.4 tons)	124 (125 crates)	324 (272 crates)	324 (179 cwt.)
N. Y., N. J., and Pa.	99 (8.2 tons)	213 (213 crates)	342 (291 crates)	311 (200 cwt.)
Colorado	120 (10.5 tons)	115 (96 crates)	300 (236 crates)	255 (120 cwt.)

1/ Usual fertilizer application for these crops was 500 pounds of 5-10-10, but other fertilizers were used on some farms.
2/ Some cultivation is done with tractor cultivator, but on small plots most of the cultivating is by hand.
3/ Some farmers treat crop with oil to avoid weeding—12 hours per acre for this operation on one farm.
4/ For bulk carrots sacked. Harvesting, bunching, and washing bunch carrots, takes 1.25 man hours per crate.
5/ See footnote 2, table 23.

however. It averaged $3,055 on these farms and ranged from $1,100 to $9,400. Average annual prices per pound to farmers for four vegetables in 1947 and back to 1943 were as follows:

	1943	1944	1945	1946	1947
Cabbage	$0.072	$0.046	$0.045	$0.072	$0.060
Carrots	.068	.060	.080	.076	.080
Celery	.202	.152	.127	.125	.125
Head lettuce	.115	.105	.104	.111	.108

At 1947 prices and with usual yields, gross returns per acre would be $1,200 for cabbage, $800 for carrots, $2,500 for celery, and $1,296 for head lettuce.

Prices for earlier years are not yet available and information on prices actually paid to farmers for 1948 has not been collected. The 1948 prices to farmers would average less than the following contract prices between the M.V.F.C.A. and the Army which are shown together with the 1947 contract prices:

	1948	1947
Cabbage per lb.	$0.070	$ 0.065
Carrots	.080	.090
Celery	.125	.160
Head lettuce	.125	.138

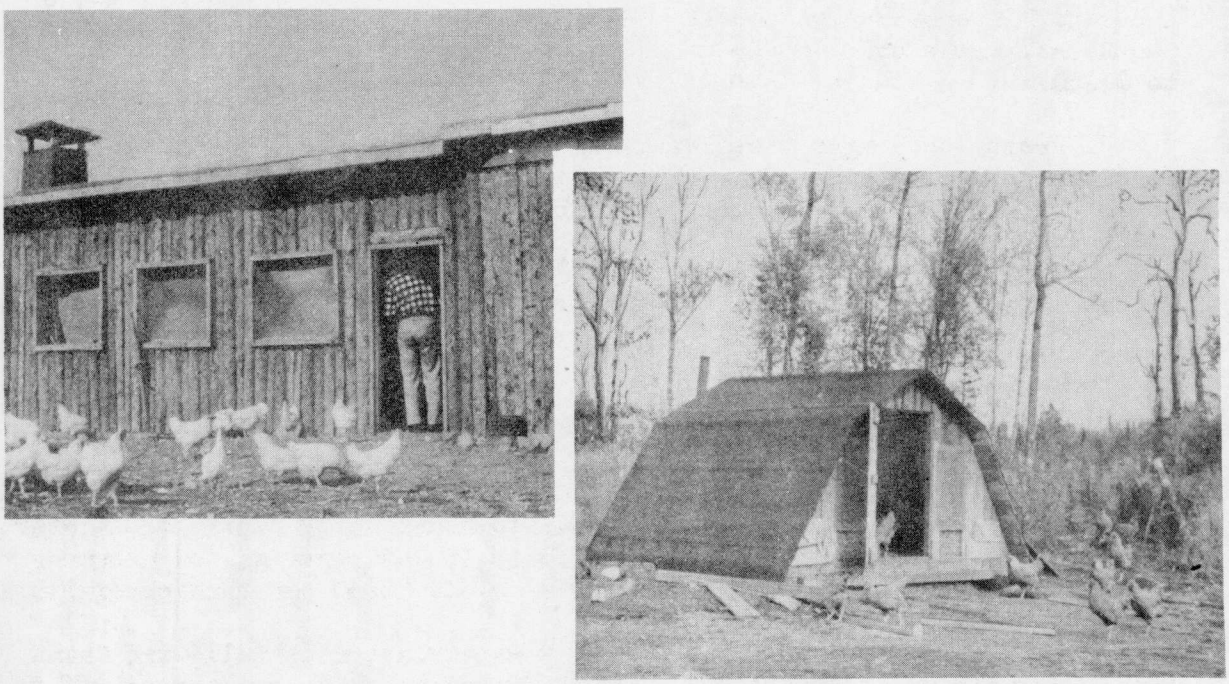

Figure 8.- Poultry house and a temporary structure in the Matanuska Valley.

Poultry

Poultry was reported on 62 (80 percent) of the 78 surveyed farms in the Valley on January 1, 1947, but only 33 farms reported more than 50 chickens. These 33 farms had an average of 171 chickens; 7 farms reported 300 or more. The largest flock was 650 hens. The average flock of the 11 poultry farms was 245 hens. Only 1 of these could be considered a full-time economic unit. 19/ With this exception poultry in Matanuska Valley constituted either a part-time farm or was one of two or more enterprises on a diversified farm. There were 3 or 4 full-time poultry farms near Anchorage and 2 at Fairbanks, in 1947.

The average annual production per hen in flocks, on January 1, for the 33 farms was 117 eggs (9¼ dozen). For the 11 poultry farms it was 127 eggs. In the United States the rate of lay per layer on hand January 1 was 127. On the 33 farms an average of 3,240 eggs per year (270 dozen) were used in the homes. This took 16 percent of the production, leaving approximately 84 percent for sale compared with 86 percent in the United States.

The average farmer in Matanuska Valley killed around 40 chickens for household use. Poultry sales included cockerels, broilers, and hens. Most eggs and much of the poultry were sold through the local Farmers' Cooperative (M.V.F.C.A.). At the cooperative the eggs are candled, graded, and packaged in paper cartons; they are sold principally to the retail trade in Anchorage. The Cooperative handled 47,628 dozen local eggs in 1947. The average price received by the 11 poultry farms in 1947 was $1.02 a dozen. Information on poultry sales was obtained from only a few producers. Hens sold for around $3 a head, cockerels and broilers for $1 to $1.50.

Fresh local eggs were retailing in Anchorage on September 27, 1948 at $1.30 per dozen in preference to air-borne eggs at $1.15. At 1948 rates for air freight, eggs are flown from Seattle at a cost of 25 to 30 cents a dozen. Stiff competition from high-quality air-borne eggs from the States is a problem which Alaska poultrymen may encounter in a period of declining prices.

Prices for egg and poultry were high compared with prices in the States, but costs likewise were high. Laying mash cost $7.50 per hundred, chicks 40 cents each, and 6-week-old pullets $1.25, electric light for supplementing short winter daylight 10 cents per kilowatt hour for the first 50, 6 cents for the next 100, and 3 cents per kilowatt hour for any additional hours. Lights are used about 12 hours daily during the winter. Fuel oil for combating the winter's cold is 18 cents per gallon, common lumber $107 per thousand board feet, and cement $2.90 per hundredweight.

19/ For convenience, however, 4 others were classed as full-time farms (table 5) because the operators did not depend on other employment off the farm.

Every year since 1942 a dozen eggs in Palmer, Alaska, would pay for more pounds of feed than a dozen eggs would buy in the State of Washington (table 28). In some years the difference was marked. In 1947 it was less than in most years since 1942. The relation between cost of poultry feed and the farm price of eggs is a major influence in determining the profitableness of the poultry enterprise.

Table 28.- Egg-poultry feed price relationships, Palmer, Alaska, and Washington State, and United States

Year	Price of a dozen eggs at Palmer 1/	Price of feed per hundredweight at Palmer			Egg-feed price ratio		
		Lay mash at Palmer	Scratch	Mash and scratch 2/	Palmer 3/	State of Washington	United States 4/
	Dollars	Dollars	Dollars	Dollars			
1940	.35	3.50	3.25	3.38	10.4	---	11.5
1941	.46	3.50	3.50	3.50	13.1	13.9	13.5
1942	.57	4.50	4.00	4.25	13.4	14.4	14.2
1943	.90	5.00	4.00	4.50	20.0	15.9	14.5
1944	.967	5.20	4.60	4.90	19.7	12.8	11.5
1945	1.16	5.35	4.70	5.03	23.1	14.8	13.4
1946	.97	6.50	6.00	6.25	15.5	13.2	11.3
1947	.98	7.50	7.25	7.38	13.3	12.7	11.1
1948	1.00	7.85	7.30	7.58	13.1	13.3	11.4

1/ Prices paid to farmers by Matanuska Valley Farmers' Cooperating Association. Tabulated from delivery slips and annual reports of the Association.

2/ Computed by averaging the price of laying mash and scratch feed. Both prices taken from sales slips of the M.V.F.C.A.

3/ Number of pounds of mash and scratch (50-50) equal to the price of 1 dozen eggs.

4/ Number of pounds of poultry feed equal to 1 dozen eggs. From United States Bureau of Agricultural Economics, Poultry and Egg Situation, February 1949.

The number of poultry enterprise for which complete data were obtained were too few to provide an entirely satisfactory basis for computing net returns. Data obtained indicate that the average of major cost and income items from the 33 farms reporting more than 50 chickens were about as follows:

Hens on hand, January 1	Number	170		
Chicks purchased	Number	270	440	
Death loss during year (10%)	Number	44		
Used in household	Number	40		
Sold: Broilers	Number	110		
Hens	Number	76	270	
Hens on hand December 31			170	
Sales: Eggs 1,390 doz. @ $1.02		$1,418		
Broilers 110 @ $1.50		165		
Hens 76 @ $3.00		228	$1,811	
Household use: Eggs 270 doz. @ $ .90		$ 243		
Hens & Br. 40 @ $2.50		100	$ 343	
Total income			$2,154	
Total income per hen				$12.67
Cost: Unsexed chicks 270 @ $ .40		$ 108		
Feed for laying flock 124 cwt. @ $7.40		918		
Feed for rearing flock 54 cwt. @ $7.40		400		
Fuel, light, litter & misc.		150		
Total cash costs			$1,576	
Total cash costs per hen				$ 9.27
Building and equipment costs (rough estimate)				.50
Total cost per hen				$ 9.77
Return to labor per hen				2.90
Return to labor per hour of work				.83

Farmers' reports indicate that the percentage death loss was lower in Alaska than the average for the United States. Feed consumption per hen in the laying flock was about one-fourth pound per day, more than half of which was laying mash. In computing feed required, it was assumed that the laying flock during the year averaged 80 percent of the number on January 1. Feed for rearing flock, including broilers, was assumed to average 45 pounds per pullet raised. Many chicken houses were the original log structures of 16 ft. x 20 ft., built by the Rural Rehabilitation Corporation. The reported investment in laying and brooder houses was about $4.25 per hen on January 1. Laying houses provided an average of 2.3 square feet of space per hen.

Fuel, light, litter, and miscellaneous costs, for which little information was obtained, must be added to costs of chicks and feed to obtain total cash costs (exclusive of labor costs, if any). Assuming $150 for these would bring total cash costs to $1,576 or $9.27 per hen in laying flock on January 1. Subtracting $9.27 from $12.67 would leave a return to capital and labor of $3.40 per hen.

Figure 9.- Beef cattle in the Matanuska Valley--one of the few herds on the mainland.

Capital costs were approximately $0.50 per hen which leaves $2.90 for labor. It takes about 3½ hours of work per hen annually, so the return to labor appears to have been about 83 cents an hour. This is less than the hourly rate for common labor, but most work on poultry is done by family labor or by the operator under circumstances which do not reduce his opportunity for hired employment.

Livestock Farming

Dairy cattle and hogs at the present time are the established livestock enterprises in the Matanuska Valley. Hogs are the major enterprise on only the few farms having access to garbage for feed. Beef cattle, sheep, and goats, are found on only a few farms.

Lack of winter feed and the competition from outside the Territory are the chief limitations to production of beef cattle and sheep on the mainland of Alaska. Harvested feed for 6 to 7 months of hand feeding is likely to be needed in most areas. Buying feed for winter use would not be economical under any foreseeable conditions, and at present it is more profitable to use the cropland for dairy-cow feed and cash crops.

Native grasses would furnish summer feed for a great number of cattle or sheep. They grow rapidly and luxuriantly. Redtop, other tall grasses, and some legumes, are nutritious during the early stages of growth, but both palatability and nutritive values decrease as the season advances. They are usually low in calcium and either low or on the borderline in phosphorus. Fish-liver oils or some source of vitamin D is needed to prevent rickets which has been observed in calves and sheep. 20/ The potential use of pastures in the valleys and on the slopes of the adjoining mountains is substantial. It has been estimated that about 20,000 cattle and 60,000 sheep could be safely supported on these pastures for about 4 months each summer. The carrying capacity of 100 acres estimated at 6 to 7 animal units for the entire summer. 21/

There are production problems other than nutrition. Bears and wolves are serious predators in some areas. Mosquitoes, moose flies, and other insects, are troublesome in spring and early summer. Livestock breeding problems may be important. Several dairy and hog farmers pointed out that often it was necessary to breed an animal several times before conception was effected. But it should be said that damage from parasites and diseases is at present apparently much less serious than in the States.

A few farmers who have favorable locations, experience, and a strong desire to do so, may find it feasible to develop full-time beef-cattle or sheep farms on the mainland even under current conditions. A few farmers are trying it.

Part-Time Farming

Part-time farmers constitute two-thirds of all farmers in the Matanuska Valley (table 3). And there is a permanent place for some part-time farming in the Valley. At present, the principal opportunities for nonfarm work are with the Alaska Railroad and the Alaska Road Commission and with military construction, mining companies, local business firms, and through self-employment.

Chief reasons for the predominance of part-time farming at this time are the costs and problems of developing and operating a farm, uncertainty as to the duration of current markets, opportunities for nonfarm work at good wages, lack of adequate cleared land, lack of capital for developing full-time units, and personal preferences. Earnings from nonfarm work are much above the 83 cents an hour returned by the poultry enterprise in 1947. Acquisition of a farm is one means of getting living quarters. Nonfarm work tides some farmers over while they are clearing and developing their farms, or is the source of funds for such farm improvements. Misfortunes of one

20/ Aamodt, O. S., Problems of Grass and Livestock, U.S. Dept. of Agr. Yearbook, 1948, p. 611.

21/ Rockie, W. A., Physical Land Conditions in the Matanuska Valley, Alaska, U.S. Soil Conservation Service, Physical Land Survey, 41. 1946, p. 3.

kind or another have forced a few to supplement their farm income by work off the farm. Half of the potato farms surveyed were part-time units, as were 55 percent of the poultry farms, 17 percent of the vegetable-potato farms, and 85 percent of the miscellaneous group.

Size of farms and land use.- Part-time farms are smaller than full-time farms, naturally. Twenty-five of the 78 surveyed farms were part-time. These had an average of 129 acres per farm as compared with over 200 acres on the full-time farms. More significant, however, is the fact that they had an average of only 31 acres of cleared land, in 1947 (table 29). Forty-seven percent of the cleared land was in hay and pasture, 27 percent in grain, and 12 percent in potatoes and other vegetables. It is noteworthy that 13 percent was idle or fallow.

Table 29.- Average acres per farm and land use on 25 part-time farms in the Matanuska Valley, Alaska, 1947

Item	Average for 25 farms	
	Acres	Percent
Cropland and seeded pasture	30.96	23.9
Other land	98.32	76.1
Total land	129.28	100.0
	Cropland and seeded pasture	
All grain	8.44	27.3
Hay	13.14	42.4
Potatoes	3.18	10.3
Vegetables	.64	2.1
Land rented out	.12	.4
Idle and fallow	4.04	13.0
Seeded pasture	1.40	4.5
Total	30.96	100.0

Livestock.- None of the 25 part-time units were dairy farms. A few farmers among the 16 who had milk cows, however, were making plans for meeting the specifications or regulations of the Territorial Department of Health for Grade A milk. There was an average of 2.2 cows and 1.6 heifers on the 16 farms. The maximum number on any farm was 5 cows and 2 heifers. Most farms had a flock of chickens, 8 had flocks ranging from 150 to over 500 hens. Four had a few geese or turkeys. Only 5 had horses. Tractors are the chief source of power on these farms as was the case on full-time farms.

Gross income and its sources on 12 part-time farms is shown in table 30. Earnings reported from nonfarm work was about 45 percent of the total gross income. Crops--mainly potatoes--and the poultry enterprise were the other major sources of income. The average gross income on these farms was only $5,789 compared with nearly $8,200 on 52 full-time farms.

Table 30.- Gross income, by sources, on 12 part-time farms, Matanuska Valley, Alaska, 1947

Source of income	Average	Percentage of total
	Dollars	Percent
Crops	1,683.75	29.1
Livestock	174.50	3.0
Poultry	109.17	1.9
Milk	20.83	.4
Eggs	633.75	10.9
Other livestock products	24.00	.4
Work off farm	2,584.67	44.6
Custom work	1.25	---
Other	50.17	.9
Non-cash	507.08	8.8
Total	5,789.17	100.0

Net income comparisons between part-time and full-time farms are not available except for potato farms. All of the dairy farms were full-time units. On six full-time potato farms the average operator's net income was $5,645. On six part-time potato farms it was $3,767, more than two-thirds of which was from nonfarm work.

OTHER PHYSICAL AND FINANCIAL REQUIREMENTS FOR FARMING IN ALASKA

Some idea of the possibilities and limitations of farming in Alaska may be had from previous sections of this report. The remainder of this report supplements these sections and helps to give a more nearly adequate but still incomplete picture of the situation.

Farm Power and Equipment

Farmers of the Matanuska Valley Colony originally had horse-drawn farm equipment and depended primarily on horses for farm power. The equipment and horses were shipped from the States to be used on the Colony farms. In recent years the Colony farmers as well as most other farmers in the Territory have adopted modern types of machinery and power.

Few farmers in Alaska now depend on horses for farm power. About 1 in 5 in the Matanuska Valley owns 1 or 2 horses. Horses are used for light work on the farms and to some extent for packing during the hunting season, but tractors are used for nearly all heavy work. Tractors make it possible to speed up farm work and take advantage of available moisture and make the most of the short growing season. Timeliness of spring work in particular is basic to successful farming in Alaska.

Nearly 9 out of 10 farmers interviewed in the Matanuska Valley owned a tractor in 1947 (table 31). Two-plow tractors were most common, but some were smaller and a few were larger. Regular tractor equipment was used generally, but some horse-drawn equipment adapted to tractor power was used. The machinery was relatively new. Much of it was bought during the war and later, but some of it dates back to 1935 and earlier. At the end of 1947 the average age of tractors was about 5 years. Motortrucks and automobiles averaged about 8 years old.

Custom work and exchange work are common among Alaskan farmers. Hiring some work done or renting a machine is often more economical than owning the machinery with which to do it. Other farmers do custom work and rent out equipment to make it possible and economical to own a machine. A few use their crawler-type tractors during the hunting season for hauling game from the kill to the highway. Exchange work also helps to keep down investment in machinery as well as cash outlays for labor. Two or more farmers often own a machine jointly as another means of keeping their investment lower than might otherwise be practicable. Among the machinery owned jointly were grain binders, potato planters, potato diggers, potato harvesters, ensilage cutters, and grain drills.

There were no field ensilage or hay choppers in Alaska as late as 1948 but several farmers were much interested in their possibilities for harvesting the oat-pea or other ensilage crops.

Investment in farm machinery varied widely among farms, but it was a sizable figure on most farms. It averaged about $4,200 on 28 dairy farms, ranging from $1,200 to $9,400. A few of the dairy farmers rented part of their machinery. Two, not included in the average, rented all of their farm machinery but each owned a truck or automobile. On potato farms the average investment in machinery was nearly $4,300, ranging from $2,400 to $7,100. The machinery investment on vegetable-potato farms averaged $3,440, ranging from $400 to $5,100.

These investments are based on cost at time of purchase and are adjusted for depreciation. Replacement values would be substantially higher. Machinery needed on a 15-cow dairy farm, for example, would cost around $5,000, at 1948 prices. At this cost level replacement costs would be around $300 a year. High annual use and inadequate care might result in even higher annual replacement costs.

Table 31.- Number of farmers reporting selected items of farm machinery, Matanuska Valley, Alaska, 1947

Type of farm	Dairy	Vegetable and potato	Potato	Poultry	Miscellaneous	All farms
Total number of farms	30	12	12	11	13	78
	Number of farmers reporting each item					
Equipment:						
Auto	9	3	5	5	3	25
Truck	25	8	9	4	4	50
Tractor	30	10	12	10	9	71
Plow	29	10	12	8	9	68
Disk	10	4	8	3	3	28
Roller or cultipacker	17	6	4	0	2	29
Grain drill 1/	21	5	3	1	1	31
Potato planter 1/	5	5	10	1	1	22
Potato digger	10	8	10	4	2	34
Potato harvester 1/	5	2	5	0	0	12
Harrow	26	9	11	7	7	60
Cultivator 1/	17	8	11	5	5	46
Mower	16	4	5	4	0	29
Binder 1/	22	6	7	3	4	42
Power saw	11	2	6	5	1	25
Milking machine	25	0	0	0	1	26
Ensilage cutter 1/	12	1	0	0	0	13
Manure spreader	11	1	2	0	1	15

1/ One or more farmers reported only part interest in the machine.

Heavy equipment and power for clearing land and for the initial plowing are generally owned by individuals who do custom work for a large part of their income or by the Alaska Rural Rehabilitation Corporation in the Matanuska Valley. The latter operates only in the Matanuska Valley.

Plows and disks were used in preparing the land on most of the farms. In the Tanana Valley and in the Homer Area, however, rototillers were used to some extent. One farmer at Fairbanks owned two large rototillers, one of which had an auxiliary motor. This implement works well on land from which the roots have been removed. It has the advantage on new land of mixing moss and other organic matter with the surface soil--an important consideration because most soils in Alaska are inherently low in organic matter.

Clearing Land a Real Problem

One of the difficult problems in developing agriculture in Alaska is the combination of energy, time, and expense necessary to bring the raw land into production. Trees, brush, and roots must be removed, in contrast with the breaking of the prairie lands in the States. At the end of 2½ years only about 1,800 acres had been cleared on the Colony tracts. About 7,000 acres had been cleared by 1948. 22/

22/ Acreages reported by Kirk H. Stone, University of Wisconsin, in Alaskan Group Settlement "The Matanuska Valley". Unpublished manuscript. January 1949.

Figure 10.- Old stumps in a pasture and stump piles near potato field. Formerly timber was slashed and stumps were cleared later. The usual practice now is to push over the stumps, bulldoze the trees and push them into rows for burning.

Two methods of clearing are used in the Matanuska Valley. Slashing, or felling the timber with a saw or an axe, and then bulldozing and piling the stumps for burning, was more common when the logs were needed for building and fuel. The stumps are sometimes left standing for several years so they will rot and be easier to clear out and burn. Dozing the standing timber and pushing the trees and brush into piles for burning is the most popular method of clearing at present. It is faster and requires less hand labor which has been both scarce and expensive in recent years. This method does not save building logs and firewood. If not skillfully done it may result in loss of top soil and humus through scraping off and burning.

The time and cost of clearing with heavy equipment, an acre of standing timber in 1948 was reported by the Alaska Rural Rehabilitation Corporation as follows:

Dozing and piling trees	8.0 hours @	$ 11.00 per hour	$ 88.00
Scatter stumps and repiling	3.0 hours @	11.00 per hour	33.00
Breaker plowing	2.5 hours @	6.50 per hour	16.25
Heavy disking	.7 hour @	6.50 per hour	4.55
		Total per acre	$ 141.80

Private contractors have stated that the original dozing and piling of standing timber can be accomplished in 5 hours per acre instead of 8 hours. The costs chargeable to heavy equipment for clearing standing timber is about $50 an acre more than it is for clearing slashed land. But this method does eliminate the costs of slashing which usually are much higher than $50 --they were estimated by one farmer who had a fairly heavy stand at $100 an acre.

In addition to the costs listed above, much hand labor is required for burning pile rows and picking up large roots before the land is in condition for full production. This item was estimated by individual farmers at 10 to 100 man hours per acre. More definite estimates on the number of hours of hand labor and costs were not available, but the time and costs certainly are a great deal less than are required for the slashing method.

Costs of clearing land covered with heavy brush, as in parts of the Tanana Valley, are less than the usual costs of clearing in the Matanuska Valley. The few estimates obtained in the Tanana Valley indicate a cost on brush land of $50 to $75 an acre for dozing and piling, burning the brush, and breaking and disking the land. Additional plowing and disking and picking roots would be needed to get the land into good workable tilth. On land with dense stands of birch and spruce the total cost would be around $200.

Alaskan farmers know and emphasize the importance of using land-clearing methods that leave a maximum of the top soil in place. They reported that best results were obtained by dozing stumps or trees when the ground was frozen, so that the bulldozer blade shears off the brush and trees at ground level. Early mistakes of pushing the top soil into the stump piles now show up across the fields in spotted or uneven growth

of plants and in lower yields. In some areas, clearing in winter may be delayed by a large accumulation of snow. Pushing aside the snow would take time and increase the expense. This leaves the best times for clearing (1) just after the snow melts in spring when the ground is still frozen and (2) after the freeze up in the fall but before much snowfall. In the Tanana Valley "The first period comprises less than one week, generally late in April or in very early May. The second period lasts from the last half of October through the first half of November. It has been found by experience that when the land to be cleared is covered by a pure stand of spruce trees (a rare condition for agricultural land in Interior Alaska), the work can be done efficiently in the spring (first period). However if the land is covered by the usual mixed growth of brush and smaller deciduous and coniferous trees, the brush and smaller deciduous trees are so flexible from the spring thaw that the bulldozer blade will not cut them except after repeated attempts and at a greatly increased and prohibitive cost." 23/ In the Tanana Valley, therefore, most clearing should be done in the fall.

Roots seriously interfere with farming operations, especially harrowing, seeding, and potato harvesting. Farmers expressed a great deal of interest in the possibility of designing a machine that would mechanically remove roots from the soil and elevate them into a truck or wagon.

Little if any crop should be expected on land cleared the previous fall or winter. Even with a good job of breaking and picking, some roots would still interfere with most farming operations. In addition, time is needed for the land to warm up after the insulating cover is removed. Because of the low fertility and low humus content of the soil the Soil Conservation Service recommends planting first-year land to a green-manure crop. Reasonably good yields should be expected the second year except on wet, poorly drained land, but roots may still interfere with some seeding and harvesting. Two or more years may be required for some lands to dry out and warm up.

Cash costs of clearing land can easily reach $100 to $200 an acre, depending on the size and density of timber, the method used, and the amount of labor hired. This is a major problem confronting any new settler, or in fact any established farmer who wishes to increase his acreage of cleared land. Some farmers have expanded their operations by leasing cleared land from other farmers. Several hundred acres were leased in 1947 for $5 per acre and a few farmers paid $7 per acre. For those farmers who are able to lease cleared land at these prices there is not much incentive to spend $100 or more and to do a great deal of hand labor to clear an acre of land.

23/ Irving Reed and George Moore, Committee of the Board of Supervisors of the Fairbanks Soil Conservation District, in a letter to Lorin T. Oldroyd, Extension Service Director, University of Alaska, June 3, 1949.

Farm Buildings

As late as 1948 there was a surplus of farm buildings other than dwellings in the Matanuska Valley. Many of the barns and poultry houses were idle. Because a critical housing shortage has existed in the Matanuska Valley since about 1941, practically all of the dwellings were occupied in 1947, many of them by employed persons with no interest in farming. This situation is principally a result of the 40-acre farm units laid out in the Matanuska Valley project which were too small for most types of full-time farming. Some of the units have been combined and in a few cases the buildings have been moved to another farmstead to supplement the original buildings. In many instances the farmstead and 5 or 6 acres of land have been sold as a unit, primarily for rural residence, the remaining acreage of the tract being sold to enlarge another farm.

The surplus buildings result partly from insufficient cleared land on the existing units. Based on a reconnaissance survey, it is estimated that 4 out of 5 barns are adequate or can be altered for use as dairy barns, and they can be used for poultry. Alterations have been or would be necessary in every case. But full use of all the buildings is not expected until additional land is cleared. The seriousness of this situation is emphasized by the fact that there is need for expanded production of fluid milk to supply the current Anchorage market, but a dairy farm in this community needs 100 to 120 acres of cleared land to provide feed for a dairy herd of 15 cows unless part or all of the grain is purchased.

Should other housing become available for employed people now living in farm houses many of the farmstead units could be used for farm headquarters. But the present cost of construction prevents many persons, both wage earners and farmers, from building houses. Rough estimates, based on information supplied by persons experienced in local needs and construction costs, indicate that a 5-room house, 28 feet by 32 feet, frame with full concrete basement, would cost approximately $7,500. This estimate is based on the assumption that all materials would be bought and all labor hired. Additional items of cost which might be considered are: Complete plumbing, $1,000; complete electric wiring, $375; hot-air furnace, installed, $450; electric water heater, installed, $135. The severity of Alaskan winters makes modern conveniences a necessity in the minds of many families.

A summary of estimated costs of developing a set of buildings for a 15-cow dairy farm under present conditions are as follows:

House	$ 7,500
Grade A barn for 15 cows	5,000
Silos - two concrete 10 feet by 25 feet	1,500
Garage, sheds, fences, etc.	2,700
Well, pump, and motor	600
	$17,300

Wages per hour in the construction trade at Palmer and Anchorage, as of December 1, 1948, were as follows:

	Palmer	Anchorage
Plumber	$ ---	$ 3.00
Electrician	---	2.90
Carpenter	2.35	2.56
Shinglers	2.35	2.69
Brick layers	2.35	3.25
Cement finishers	2.35	2.75
Common labor	1.50	2.13

The costs of building materials in 1948 from the Matanuska Valley Farmers' Cooperating Association at Palmer, were as follows:

Shiplap, M.	$ 107.00
Dimension, M.	107.00
Fir or other flooring, M.	225.00
90 pound roll roofing, roll	7.50
Celotex interior, M.	95.00
Celotex exterior, M.	210.00
Finish nails, pound	.17
Box nails, pound	.17
Standard doors (2-8x 6-8)	12.00
Windows (34 x 41)	6.25
Masonite, per foot	.17
Plywood ($\frac{1}{4}$")	.17
Insulation (rock wool, med. bat.) M.	120.00
Building paper, roll	4.50
Finished lumber for inside trim, M.	200.00
Cement, hundredweight	2.90

The original buildings constructed by the Alaska Rural Rehabilitation Corporation on farm units in the Matanuska Valley project included a house, barn, poultry house, and shed. Typically the houses were $1\frac{1}{2}$ stories, 28 feet by 32 feet; the barns were 32 feet by 32 feet, with loft; and the poultry houses were 12 feet by 16 feet. Some of these buildings were of frame construction; others were of log. The original dwellings and poultry houses were erected without stone or concrete foundations and were set on logs which have since decayed. Many owners are finding it necessary to install new foundations, using mostly cinder blocks or concrete.

Many of the Colony houses have been modernized with electricity, running water, indoor toilets, and other facilities. The barns are serviceable, but require either a separate "milking parlor" or a remodeling of the milking and feeding room to meet Territorial sanitary regulations for Grade A milk. Several of the dairymen, however, expressed a preference for barns of a different size or type.

Capital Requirements

Farming in Alaska on a scale that will provide even a minimum adequate income for a family requires a substantial investment. This is apparent from the previous discussion of typical farms in the Matanuska Valley, farm power and equipment, and farm buildings. Further assurance on this comes from a committee of Tanana Valley farmers which made the following estimates of the investment necessary to bring each of 5 types of farms into full production in the Fairbanks or Tanana Valley area.

Poultry	- 1,000 hens and 50 acres cleared	- $26,040
Vegetable	- 40 acres cleared	- 20,392
Potato	- 120 acres cleared	- 25,122
Hog	- 40 acres cleared, 20 gilts and 2 boars	- 23,032
Dairy	- 15 bred heifers and 100 acres	- 39,964
General	- 120 acres cleared	- 38,443

These estimates are based on prices and costs in 1948 and on the committee's experience in Alaskan farming. The committee assumed that land would be obtained by homesteading and the only large outlay for it would be $75 an acre for clearing. They used $5,950 as the cost of a suitable house. The above figures are for capital expenditures and do not include living or farming expenses. The committee estimated one year's family living expenses to be $2,000, at 1948 prices. Operating expenses the first year would be chiefly for clearing land and are really capital expenditures. The second year's expenses for farming the cleared land would vary with the type and size of the farm enterprises.

Before receiving the estimates of investment from the Tanana Valley farmers' committee, the authors prepared separate estimates of investment capital needs for developing dairy farms under the conditions in the Matanuska Valley where costs of clearing are higher. These estimates are subject to refinement, but they give a good indication of the size of the problem. They are based on the assumption that all labor for constructing the buildings would be hired and that materials and equipment would be bought new. Deviations from these assumptions should lower the cash outlay. Federal aids to clearing are omitted from the estimates. The Agricultural Conservation Program allowances for clearing were $20 an acre in 1947, $10 in 1948, and $40, not to exceed half of the clearing cost, in 1949. The authors' estimates follow.

A 15-cow dairy.- Timber land suitable for clearing would cost $20 to $40 per acre in the Matanuska Valley. Using $25 as a minimum average price, 160 acres would cost $4,000. Using $125 per acre as the minimum cash cost for clearing, 120 acres would require an expenditure of $16,000. In addition, there would be an enormous amount of hand labor, much of which would have to be hired if the land were to be brought under cultivation within 2 or 3 years. Land acquisition and development costs would represent an initial cash investment of at least $20,000. For those who could obtain land by homesteading this would be reduced by $2,000 to $4,000.

Cost of new buildings, including $7,500 for a dwelling, for a dairy farm as given in greater detail earlier in this report, is estimated at $17,300. Land and buildings would therefore cost $37,300.

Fifteen dairy cows at $300 each would cost $4,500. Two heifers at $200 each would cost $400 more, and 2 heifer calves at $100 each would cost $200 additional. Dairy animals would cost a total of $5,100, at 1948 prices.

Farm machinery, including a tractor and pick-up truck, needed to operate a 15-cow dairy farm, if new, would cost approximately $5,000 at 1948 prices.

A summary of the estimated cost of buying 160 acres and establishing a 15-cow dairy farm is as follows.

160 acres of land	$ 4,000
Clearing 120 acres	15,000
Buildings and well	17,300
Livestock	5,100
Machinery	5,000
Total	$46,400

Although very few settlers would try to start on the above scale there is little doubt that eventually, with 1948 prices, an investment of $40,000 to $50,000 would be required to establish a dairy farm of efficient size. Plans for anything less than this would probably result in serious problems at a later date.

An 8-cow dairy.- Assuming a settler wished to start an 8-cow dairy and build up to a 15-cow dairy, his original capital requirements would be as follows.

160 acres of land	$ 4,000
Clearing 64 acres	8,000
Building and well	14,550
Livestock	2,880
Machinery	4,000
Total	33,350

Although original capital requirements would be reduced by more than $13,000 the total that would eventually be required would not be reduced but net income would be reduced by more than half. The land needed to furnish all feed for 8 cows would be about 64 acres but if grain-feed requirements were purchased about 13 fewer acres would be needed, and the investment in land clearing would be reduced by $1,625.

A 10-cow dairy.- Assuming that the settler wished to buy his concentrates, as most dairymen do now, instead of raising grain, 64 acres of cleared land would provide the other feeds for 10 dairy cows. This method of farming would increase the capital requirements by about $900 for livestock and $600 for barn space. It would result in a less efficient use of labor and equipment and a shortage of straw for bedding.

The above estimates of cost are based on contract rates for labor and materials. There is a possibility, however, that actual cash outlay could be substantially reduced. This might be done in two ways. The use of as much native building material as possible, such as logs, where available for buildings, would reduce the cost of materials. The settler might do as much of the construction as possible instead of hiring it done. This procedure would be feasible only for those farmers who have some ability in construction work. If all of the construction were done by the settler there might be much delay in getting the farm into full production.

Alaskan farms need large investment and operating capital, particularly when much of the labor is hired. Costs of production goods and costs of food are high, as shown in tables 32 and 33. It is important to

Table 32.- Basic food costs (compiled by Home Economics Department, Anchorage Alaska High School, March 1948)

Food	Unit	Average price	Food	Unit	Average price
		Dollars			Dollars
Bread	Loaf	0.35	Fresh tomatoes	Pound	.60
Butter	Pound	1.15	Frozen peaches	do.	.45
Cheese	do.	.84	Frozen strawberries	do.	.70
Cocoa	do.	.31	Frozen asparagus	do.	.65
Coffee	do.	.31	Frozen green beans	do.	.40
Eggs: Boat	Dozen	.83	Frozen peas	do.	.43
Local fresh	do.	1.15	Canned grapefruit #2	Can	.33
Flour	Pound	.14	Canned orange juice #5	do.	.45
Milk: Dry	do.	.85	Peaches #2½	do.	.48
Evaporated	Can	.20	Pineapple #2½	do.	.50
Fresh	Quart	.45	Canned corn #2	do.	.30
Oleomargarine	Pound	.55	Canned peas #2	do.	.30
Granulated soap	Package	.60	Canned string beans #2	do.	.33
Sugar	Pound	.17	Tomato juice #5	do.	.45
Fresh apples	do.	.20			
Bananas	do.	.45	Calf's liver	Pound	.70
Fresh grapefruit	do.	.20	Hamburger	do.	.95
Fresh oranges	do.	.20	Bacon	do.	1.10
Fresh cabbage	do.	.20	Ham	do.	1.15
Celery	do.	.35	Chicken	do.	1.00
Lettuce	do.	.35	Round steak	do.	1.00
Onions	do.	.24	Fresh salmon	do.	.60
Potatoes	do.	.08	Weiners	do.	.80

remember that family living expenses and farm operating expenses must be obtained largely from nonfarm sources until the farm becomes productive. It usually will be at least 2 years before much income can be expected from the new land. Furthermore, although the cleared land may be fairly productive the second year and may be good the third, only a small part of the

Table 33.- Selected prices paid by farmers at Palmer, Alaska 1/

Item	Unit	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948
		Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Fertilizers											
Amon. nitrate 33%	Cwt.						5.60	5.40	5.90	5.90	5.90
Amon. sulfate 20%	do.		3.30	4.25		4.75	4.00	4.25		4.25	5.60
Amon. phosphate 16%	do.			4.95	4.75	4.85	4.35	4.25		5.60	5.70
Sodium nitrate 16%	do.		3.30	3.35	3.70	3.70	3.75		4.40	4.40	4.80
Super phosphate 43%	do.		3.50	3.80	4.00	4.00	3.90	4.00	4.45	4.45	4.45
Muriate of potash 47%	do.		3.25	3.30	3.65	3.95	3.95	3.85	4.50	4.50	4.50
More crop	do.						3.65	3.85	4.10	4.25	4.05
Livestock Feeds											
Lay mash	do.		3.50	3.50	4.50	5.00	5.20	5.35	6.50	7.50	7.85
Hen scratch	do.		3.25	3.50	4.00	4.00	4.60	4.70	6.00	7.25	7.30
Oyster shell	do.		2.30	2.30		2.35	3.00	3.50	3.50	3.80	4.30
Starter mash	do.		4.00	3.85	4.60	4.90	5.65	5.85	6.50	7.50	8.00
Starter scratch	do.		3.50	3.75	4.25			5.10	6.00	7.25	7.50
Dairy ration	do.	3.15	3.00	3.50	3.80	4.50	5.10	5.10	5.70	6.75	7.00
Molasses dairy	do.			3.30	3.70	4.30	5.00	5.10	5.70	6.75	7.00
Salt	50#blk.				2.00	1.75	2.20	2.25	2.75		2.95
Soy meal	Cwt.				4.85	5.20	5.20	5.60	7.10	8.40	8.70
Linseed meal	do.				3.95	4.80	4.95	4.95		7.25	8.40
Dairy concentrate	do.			3.15	4.70	4.85	5.85				
Fish meal	do.	4.35		3.15	3.50						12.50
Bone meal	do.	3.60	3.60	4.50		5.50			5.00	5.80	6.65
Meat scrap	do.				4.90	5.65					
Calf meal	do.	7.00		4.40	7.00	7.00	7.00		7.05	8.00	10.90
Wheat	do.	3.20	3.50	3.95	4.00				5.75	7.25	8.15
Corn	do.	3.22							6.30	7.00	8.70
Oats	do.					4.15				7.00	8.80
Seeds											
Oats	Cwt.		3.45	3.50	4.15	4.60	5.35	6.00	6.30	7.10	8.80
Peas	do.		7.50	7.00	7.25	7.50	8.75	9.65	9.65	10.05	**10.70**
Barley	do.		3.60	4.40	4.40	4.40	6.00	6.90	6.30	7.25	**9.55**
Vetch	do.		7.00	7.00	8.25	8.25	9.50	9.65	12.30	11.45	**12.25**
Wheat	do.		3.50	4.40	4.40	4.40	5.00	7.20	8.00	8.00	10.60
Potatoes	do.		4.50	4.00	5.00		6.65		6.00	6.00	
Bluegrass	Pound		.25	.30	.30	.40	.40	.40	.85	1.45	.60
Brome	do.		.25	.25	.30	.30	.27	.27	.25	.40	.39
Alsike	do.		.30	.30	.28	.35	.35	.45	.50	.75	.75
Red clover	do.				.40				1.50		.75
White clover	do.			.75	.80			.75	.85	.90	.75
Timothy	do.			.10		.20		.20	.17	.22	.20
Lettuce	do.					3.00		7.00	3.50	3.30	
Carrots	do.				6.00	3.60	5.70	5.35		5.75	2.25
Rutabaga	do.						1.65	1.65		.90	
Radish	do.						1.30		1.15	1.20	
Beets	do.				2.00			3.15		4.35	1.50
Swiss chard	do.				2.00				1.20	1.40	
Onion sets	do.									.45	.35
Cabbage	do.				2.75						3.30
Sweetclover	do.			.13			.25		.25	.45	.75
Turnips	do.							1.50		1.00	
Meadow fescue	do.			.75						.75	
Red fescue	do.								.80	.95	
Onion seed	do.									6.10	
Supplies											
Potato sacks	Each				.19	.35	.27		.20	.27	.29
Lettuce crates	do.				.35	.55	.50		.55	.50	
Binder twine	Bale				7.20	8.90	8.90	8.90	15.00	14.50	
Baling wire									10.00	8.50	
Corrosive sub.	Pound			3.75	4.40		4.40		4.40		
Ceresan	do.			1.20		1.25	1.50	.85			
Gasoline, retail	Gal.										.32
Gasoline, bulk	do.										.25
Fuel oil	do.										.18

1/ Taken from sales slips Matanuska Valley Farmers' Cooperating Association.

acreage needed for a full-time farm is likely to be cleared in 1 year, consequently completing the clearing and getting all the cropland into full production frequently requires 5 years or more.

Assembled price data suitable for use in farm budgets were not available in either published or unpublished form so it was necessary to assemble price data for Alaska. Data on prices paid for selected production items are shown in table 33. Data on prices received are shown in table 34.

Some of the price data were fragmentary. Prices paid throughout a specific year were not always available. They could not be weighted statistically by quantities sold, but an attempt was made to weight them on a judgment basis. This was done by using prices in effect at the time when purchases were estimated to be the heaviest. For example, the price paid for commercial fertilizer during the spring was considered representative. The summer and fall prices of binder twine were considered most representative for that item.

Credit Problems

A most distressing problem facing new settlers, as well as those who have been several years in some of the areas, is the lack of funds to develop their farms into productive full-time units. Loans that are available come mainly from three sources: Alaska Rural Rehabilitation Corporation, Farmers' Home Administration, and local banks. Merchants and individuals still grubstake a few individuals, but credit from this source is mostly for seasonal use. Farmer credit from local banks has also been primarily, though not entirely, for short-time use - often not more than 6 months.

At the present, credit is not a distressing problem to most of the established Matanuska farmers. Their credit comes primarily from the A.R.R.C. and F.H.A. A few have substantial loans at 8 percent from private sources. The original real estate loans from the A.R.R.C. are amortized over a 30-year period. The interest rate is 3 percent. Later loans on developed tracts also draw 3 percent interest and mature after 15 years. The first payment on the A.R.R.C. loans to colonists was due November 15, 1940, but because of slowness in getting land cleared and into production the time was extended 2 years. Chattel mortgages are made for various periods to meet the needs. Those for clearing land and for capital improvements mature within 5 years, commonly running for 18 months to 2 years. They draw 6 percent interest. Crop-planting loans usually are for 12 months. Harvesting loans are for 30 to 90 days. Loans from the A.R.R.C. are not available to all new farmers.

Real estate loans of the Farmers' Home Administration mature after 40 years, drawing 4 percent interest. Its operating loans run from 1 to 5 years and draw 5 percent interest on the unpaid balance. F.H.A. loans in Alaska may be made at the same interest rates for the same number of years as in the States.

Table 34.- Prices received by farmers, Palmer, Alaska 1/

Item	Unit	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948
		Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.
Milk B	Cwt.		2.61	2.61	3.05	2/(6.12	5.30	5.30	2/(7.28	2/(7.03	3/ 4.04
Milk A	do.		4.30	4.30	4.73	(	6.50	6.61	(	(	3-4/ 8.85
Eggs	Doz.	.35	.35	.46	.57	.90	.967	1.16	.97	.98	1.00
Beef	Cwt.						23.00	24.00	29.70	34.60	
Veal	do.						27.40		28.60	48.10	
Pork	do.						20.00	22.00	48.20		
Meat	do.					24.80			34.40	36.80	
Potatoes	Cwt.	3.00		4.00	6.00	5.00	4.75	2.00	3.00	5/ 4.77	6/ 4.18
											7/ 4.00
Head lettuce	do.					11.46	10.51	10.40	11.07	13.80	6/ 12.50
Celery	do.					20.17	15.20	12.70	12.53	6/16.00	8/ 12.50
										8.09	12.00
Carrots	Cwt.	4.00				6.84	6.00	8.00	7.56	6/ 8.00	8/ 9.00
Radishes	do.					7.90					
Cauliflower	do.	8.00				3.69	14.80	22.00	13.03	6/16.00	
Carrots	Bunch	.08				.115	.122	.140			
Radishes	do.	.04				.087	.027	.026			
Cabbage	Cwt.	4.00				7.17	4.63	4.50	7.16	6/ 6.50-10	5/ 7.00
										4.68	
Onions	Bunch	.06					.099		.10		
Rutabagas	Cwt.						6.00	7.00			
Rhubarb	do.						6.00	9.00			
Turnips	do.	4.00					6.00				
Beets	do.										8/ 12.50

1/ Taken from reports of Matanuska Valley Farmers' Cooperating Association except as otherwise indicated.
2/ All milk. 3/ Through September 15. 4/ $10.50 cwt. effective September 15.
5/ Weighted average price received by 60 producers. Contract of M.V.F.C.A. with Army-prices delivered at Fort Richardson were $4.25.
6/ Contract of M.V.F.C.A. with Army-delivered at Fort Richardson.
7/ A dealer's contract price with Alaska Railroad - 90 tons potatoes.
8/ Valley producers selling to Army through broker. Broker takes 22 percent of this for commission.

Outside the Matanuska Valley, F.H.A. and private businesses are the chief sources of credit. Farmers in the Tanana Valley report interest rates of 8 percent. They say that the greatest obstacle facing them and other new settlers is lack of credit at moderate rates of interest. Because of the lack of funds or for other reasons, F.H.A. has not been able to meet all of the credit needs of farmers in the Tanana Valley and other areas. However, enactment of Public Law 361, 81st Congress, First Session, approved October 19, 1949, will ease this situation. Under authority of this act, F.H.A. can now make loans to settlers on unpatented homesteads, taking a real estate mortgage as security.

Lack of credit with which to clear land, erect buildings, and do farming, is a major handicap to a great many settlers. Many come to Alaska uninformed or with misconceptions of the amount of capital required to settle and develop a farm. A great many do not have enough resources to offer as security for borrowed funds. This has been especially true of the homesteaders, whose unpatented, undeveloped lands were not considered acceptable security for loans. On the other hand, the limitations on credit for agricultural development in Alaska may be attributed in part to the limited supply of loanable funds usually characteristic of frontier areas, to the large demand for those funds from varied lines of activity in an expanding pioneer community, and to inherent risks of lending in new and comparatively undeveloped areas.

The farmers in Matanuska Valley generally were fairly well satisfied with the credit services available to them. Most of them were not overloaded with debts at the end of 1947. Several were debt free. The maximum debt recorded in 1947 was about $12,000. The average indebtedness on 44 farms was $4,221, the maximum being $9,754 (table 35). The larger debts were acquired to finance recent expansions in the farm businesses. Information on the 44 Colony farms are shown here to illustrate the extent to which the debt settlement program of 1937 reduced debts on the Colony farms.

Table 35.- Indebtedness before and after debt adjustments, 44 Colony farms, Matanuska Valley Alaska

Item	Average	Range	Total
	Dollars	Dollars	Dollars
Original indebtedness, 1937	12,625	6,261 to 17,613	555,486
Debt reduction	7,497	5,399 to 12,241	329,865
Net after reduction	5,128	1,855 to 7,770	225,620
Indebtedness, Dec. 1947	4,221	0 to 9,754	185,738

The debts were reduced near the end of 1937 after it became obvious they were too high for the colonists to repay. Detailed discussion of colonists' debt accumulation and debt adjustment is beyond the scope of this study. It is included in an historical analysis of the Colony experience as a whole now being made by Kirk Stone at the request of the Department of the Interior-Department of Agriculture Committee on Group Settlement in Alaska.